

It Hurts:

*The relationship between mental imagery and
functioning in chronic pain*

Louise Potter

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Thesis Abstract

It Hurts – The relationship between mental imagery and functioning in chronic pain

Louise Potter

Introduction – It was observed that many chronic pain patients report mental images of their pain and that there is very little literature describing the nature and consequences of these images. The present study had two primary aims: firstly to examine what relationship, if any, there is between those who describe mental images of their pain and functioning. Secondly, to examine whether cognitions or acceptance would explain more of the variance in levels of reported anxiety and depression.

Methodology – A total of 83 chronic pain patients were recruited to complete a battery of measures (HADS, CPAQ, AAQ, R+M SIP, McGill (SF), PRCS and PRSS). Included were chronic pain patients of all ages with any medical diagnosis. Excluded were those with chronic pain of a malignant nature, those not fluent in the English language and those with a psychotic illness.

Results – Significant differences were found between the group of people who had mental images of their pain and those who did not on measures of anxiety, depression and catastrophising. No mean differences were found on measures of disability and levels of reported pain. Partial correlations showed that catastrophising explained more of the variance in HADS scores than did acceptance though differences were small and this may be a facet of using two different measures of acceptance.

Discussion – Having mental images of pain appears to indicate much higher reported levels of anxiety and depression. Findings are discussed in light of the existing literature base. Further research is needed to investigate the links between acceptance, cognitions and reported levels of anxiety and depression.

It Hurts: The relationship between mental imagery and functioning in chronic pain

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Chapter One: Introduction

1.1 Layout of the thesis

This introductory chapter defines the key concepts as they are used throughout this thesis and provides a brief overview of key debates and discussions around these areas. The terms “pain” and “chronic pain” are defined so that reader and writer share a common terminology. These concepts have several different meanings and understandings in different settings and by different professionals. Chapter Two examines the generally accepted theories of chronic pain, including some of the most important theories used in psychological approaches to working with chronic pain patients. The most influential theories of pain are discussed and examined. Chapter Three discusses psychological aspects of pain as they have been shaped by the theories that preceded them. Literature is then discussed and examined in the light of key approaches. Although there are many different forms of therapy employed to help people with chronic pain, two key therapies will be discussed in detail. The hypotheses adopted for the current research are then outlined in turn. In Chapter Four the use of imagery within pain settings is examined and discussed and the hypotheses are introduced. In Chapter Five the methodology used to examine the research question is outlined. Chapter Six describes the results of the research and provides some graphic representations of the findings. In Chapter Seven these results are discussed in light of the literature base as it stands. Implications for future clinical practice and research are also discussed here. Finally the author will attempt to draw some conclusions from the current research.

1.2 Definitions and Prevalence of Chronic Pain

For the purposes of this thesis “Chronic Pain” will be the term used to refer to people who suffer from pain of non-malignant sources for a duration in excess of three months (International Association for the Study of Pain, 1986). In reality most clinical psychologists working in chronic pain find that the majority of patients have a much longer duration of pain. Turk and Okifuji (2001) perhaps more usefully define chronic pain as pain that is often (but not always) elicited by an injury but worsened by factors removed from the original cause, usually lasts a long time and is not explained by underlying pathology. A World Health Organisation study has confirmed that pain is the single most important predictor of poor quality of life (Skevington, 1998). Some researchers argue that pain relief is a fundamental human right as well as good clinical practice (Brenan and Cousins, 2004).

The International Association for the Study of Pain (IASP, 1986) defined pain as “a multi-dimensional concept encompassing sensory, cognitive-evaluative and affective-motivational dimensions”. A more recent definition by the IASP (1994) defined pain as an unpleasant sensory and emotional experience associated with actual or potential tissue damage and described in terms of such damage. These definitions are widely used within chronic pain literature as they not only encompass the physical sensations of pain but also that the experience of pain is an emotional one. The actual physical sensation of pain is one with which all living animals are familiar. However it is important to take into consideration that pain and suffering do not necessarily depend on the level of pain experienced. Pain is generally conceptualised as a complex subjective,

perceptual and multidimensional phenomenon that varies in intensity, quality, time course and personal meaning (Merskey & Bogduk, 1994).

There are three primary types of pain described in the literature – phasic, acute and chronic. Phasic pain has a brief time course usually subsiding within minutes (Craig, 1999). For example, when a person stubs their toe it is usually painful but once the immediate cause of pain is gone the pain subsides quickly. Acute pain is usually associated with tissue damage and reflects an injury. At this point, pain is acting as a useful and protective mechanism. Acute pain resolves once healing is complete and allows the individual to resume their normal daily life. Chronic pain is usually taken to mean pain that has persisted after the expected healing period. Merskey and Bogduk (1994) defined pain as chronic when it lasts at least three to six months. In contrast to phasic and acute pain, chronic pain does not have any obvious protective value.

A diagnosis of chronic pain may not necessarily be accompanied by a diagnosis of an identified disease or specific mechanism of pain. Chronic pain can persist both alongside and in the absence of a diagnosable disease or disorder. Some disorders, for example chronic regional pain syndrome (CRPS) are associated with a long term experience of chronic pain. In some disorders such as CRPS pain is one of the defining characteristics of the disorder itself and must be present for a diagnosis to be made. Other problems, such as chronic pain after surgery or accident have no particular identifiable root cause of the pain. Many of these difficulties are described as neuropathic in nature. That is to say that the nerves have been damaged in some way

and pain is continuing to be experienced by the patient long after any tissue damage has healed.

Prevalence figures for people suffering from Chronic Pain in the United Kingdom vary widely but are generally reported between 15% and 20.7% (Breivik et al, 2006, Gureje et al, 1998). However, there is some debate about this figure as a study by Harstall and Ospina (2003) found a prevalence rate in the population to be approximately 36% (with estimates between 11.5% and 55.2%). This conclusion was following a large scale systematic review of literature to date. Research undertaken in the North-East of Scotland found that nearly half the population sampled experienced chronic pain, with back and arthritic pain being the most common (Elliott, Smith, Penny et al, 1999). However, this was a sample drawn at random from general practice registers. All the measures were self report measures and it is likely that the estimate is higher as people who did not suffer from pain would be less likely to respond to the self report measures than would people who did suffer from pain.

Despite difficulties in ascertaining an absolute prevalence rate, estimates show that this problem affects large numbers of people. As a consequence chronic pain places a large burden on health care services, with 40% of sufferers of chronic pain visiting their GP on a monthly basis and 58.4% taking prescription analgesics (Haetzman et al, 2003). In 1998 the direct healthcare cost of low back pain alone in the UK was estimated to be £1.6 billion (Maniadakis and Gray, 2000). As this is only one of many different causes of chronic pain it is clear that the total cost of chronic pain both to the NHS and to the wider economy is substantial.

In a recent Europe-wide study Breivik et al (2006) found that an extensive number of respondents (46,394 participants) had experienced pain for 6 months or longer and rated their pain as more than or equal to 5 on a numeric rating scale (1=no pain, 10=worst pain imaginable) during the last episode of pain. These statistics equate to one person in five in Europe suffering from chronic pain with two thirds of the cases reported to be moderate pain and one third severe pain. When Breivik et al (2006) asked respondents if they had ever been diagnosed with depression due to their pain, they found that 21% of their sample answered “yes”. Although this number is high, measures of pain were self report and the findings were not discussed in conjunction with statistics about numbers of people who may have either been taking anti-depressant medication or those who may have in the past or were currently receiving clinical psychological or other therapeutic support. Clinical psychologists can do much to alleviate depression within a chronic pain population but there are relatively few clinical psychologists working in this area compared to the number of people suffering from chronic pain. According to Breivik et al (2006), of the 1 in 5 Europeans suffering from chronic pain, 1 in 5 of these people will also have a diagnosed depression due to their pain.

1.3 Understanding Chronic Pain

The function of pain is ordinarily to indicate that something is wrong physically, for example after acute injury and associated tissue damage. First and foremost pain is a biological warning signal that is necessary to protect us from damage. If humans were not to have a pain response then they would have no way of knowing when they were injured and would be more susceptible to re-injury. Descartes (1664) created the

famous drawing of the boy with his foot in the fire to illustrate how he believed the pain mechanism worked. That is to say that the message of acute tissue damage was relayed to the brain via the spinal cord telling the person that pain was being felt. Dualism is the idea that the mind and the body are separate entities. Descartes believed that the pain signal was transmitted to the brain in a kind of hydraulic model and that when it reached the pineal gland it crossed from the physical being into the spiritual. Descartes believed the pineal gland supported the body's connection to the soul, which was the seat of consciousness. The theory was focused around the pineal gland as it is the only structure in the brain not to be in two halves (see, for example, Procacci & Maresca, 1994; Shealy & Cady, 2002).

This Cartesian model of pain prevailed for many years but was never fully explained nor explored. The legacy of this model still exists today, with two of the main assumptions – namely that there is a one to one relationship between the amount of damage caused and the pain experienced and that, though connected, the mind and the body are separate entities. In acute pain, this model does appear to explain a lot of the variance observed (Wilkinson, 2001). However it is clear that this mechanism alone cannot explain the experience of having chronic pain and individuals may react differently to similar types of tissue damage. Indeed the same individual may act differently to the same tissue damage injury when this injury takes place in two different settings. For example, the rugby player who receives a gash to the head during a rugby match. He describes no pain at the time, is stitched up and plays the rest of the match. If this same person received an identical tissue injury due to being assaulted whilst he was walking down the street he may be likely to describe much higher levels

of pain and distress due to the same tissue injury. The idea of damage equals pain is not sufficient to understand the complexities of chronic pain, phantom limb pain or how it is possible for people to not recognise wounds (for example, battle wounds) until the threat to life has passed (Skevington, 1996; McMahon & Koltzenburg, 2005). However the Cartesian model was a significant advancement on its predecessors because for the first time it postulated a mechanism of pain transmission from the periphery of the body to higher centres in the brain.

The context in which pain is experienced has an impact on the experience of pain and how this is dealt with by the individual. Our understandings of the psychological underpinnings of the experience of chronic pain are very different from those of acute pain. Within acute pain, the individual would expect that the pain is short term and therefore act in such a way as to facilitate recovery and pain lessening. Strategies such as staying still to avoid re-injury and avoidance of partaking in anything that causes the pain to be aggravated are generally effective within acute pain. However, when pain becomes chronic these strategies are no longer fruitful in helping the individual experience as great a quality of life as possible.

There are also many other health and psychological problems associated with chronic pain. A highly important finding is that the risk of death by suicide is doubled in chronic pain patients when compared with controls (Tang and Crane, 2006). A review of the literature found that the general prevalence of suicidal ideation in chronic pain patients is 20% (Tang and Crane, 2006). These findings are consistent with research evidence that the incidence of clinical depression is much higher within this population

(e.g. Kraemlinger, Swanson and Maruta, 1983; Breivik et al, 2006). It would appear from these studies that having a chronic pain condition is a risk factor in itself for death by suicide and consequently it could be argued that psychological intervention is particularly important for these patients.

Having chronic pain has also been found to be a risk factor for many other forms of psychological and sociological difficulties. For example, many people with chronic pain find that they struggle financially as their pain either prevents them from working or makes it much more difficult to find suitable employment. The associated difficulties of unemployment can be a loss of financial stability, loss of role within the family, loss of productivity, loss of self esteem and loss of feelings of belonging to and being a useful part of the community as a whole. The ability to carry out activities of daily living can become compromised due to chronic pain. Chapman and Garvin (1999) found that the experience of chronic pain is frequently associated with a cluster of related problems such as chronic fatigue, sleep disturbance, excessive rest and withdrawal from activity, compromised immune function and mood disorder.

1.4 Introducing the Research Problem

The current research problem evolved from an interest in the images that chronic pain patients reported about their pain. It was noted from clinical practice that a proportion of patients when asked to describe their pain used very vivid visual images. However, there is a lack of empirically evidenced work surrounding visual imagery within chronic pain and what impact, if any, they may have on the functioning of the people reporting

them. This has a myriad of clinical implications about the way in which psychologists may begin to work with these images that people are reporting. If these images moderate a person's cognitive style, physical disability or experience of pain then psychologists need to become more aware of these images and start to conduct further research into the impact that this may have for clinical practice. An examination of the literature revealed that very little empirically evidenced work has been undertaken on the imagery that people have of their pain. It was both the lack of empirical evidence and the interest in anecdotal evidence from clinical work that sparked the current research and has driven the research design described herein.

Chapter Two: Theories of Pain

Several attempts have been made to explain the pain phenomena and aid our understanding of the complexities of pain. Although these models generally create widespread debate they are not able to account for all the different aspects of pain. However they are the starting point for our understandings of how the brain-body interaction works in causing the pain response and of how and why this breaks down in some cases to produce a chronic pain. The most important and influential theories of pain are presented in chronological order here.

Knowledge and understandings of pain started with Descartes' (1664) Cartesian model. Descartes (1664) attempted to show that humans consisted of an earthly machine that was inhabited and governed by a rational soul. The body was essentially a machine and the workings of the machine could be explained by the laws of nature. The famous

picture of the boy with his foot in the fire and of the nerve fibres transmitting the signal up to his brain helped to explain his theory. Within Cartesian models of pain, the relationship between the machine and the rational soul was never fully explored nor explained. However, some parts of this theory have persisted into modern day pain management techniques. The idea of a mind body split has left the legacy that pain is either physiological or psychological. Many patients find engaging in pain management difficult as they believe that if pain cannot be cured then it is being attributed to being psychological and therefore not “real” pain. However the vast majority of chronic pain services generally accept an interaction between physical and psychological aspects.

2.1 Gate Control Theory of Chronic Pain

Melzack and Wall’s (1965) Gate Control Theory postulates that both physiological and psychological components combine to produce a person’s experience of pain. Gate Control Theory postulates that spinal “gates” in the dorsal horn at each segmental level in the spinal cord can mediate the pain signals sent to the brain. Critically, this theory proposes that, depending on the patient’s emotional state, descending messages from cortical and subcortical structures may either amplify the pain signal (open the “gate”) or prevent its access (close the “gate”). It was of such landmark importance for two primary reasons – in terms of the mechanisms of the transmission and modulation of nociceptive signals and also in terms of its recognition of pain as a psychophysiological phenomenon resulting from the interaction between physiological and psychological events. Gate Control Theory incorporated physiological specialisation, a central processor and modulation of pain experience by psychological

and psychosocial factors. This theory formed much of the contemporary psychology of pain. In contrast to Descartes (1664) theory the transmission of information from the nerves is not a one way process – messages can descend from the brain as well as ascend to the brain.

Gate Control Theory generated much debate about the physiology of the model (e.g. Nathan, 1979, Price, 1987) and had a significant impact upon the treatment of pain in particular in making psychological approaches a viable and useful adjunct to pharmacological methods. This model meant that psychological approaches were validated as an alternative to pharmacology as it takes into account a person's emotional state at the time of the pain experience and also allows patients some aspects of control over their pain experience. There were however some difficulties with this model. Although there is evidence for proposed moderators there was no physical evidence of a gate. It also still gave an organic basis for pain which would not explain phenomena such as phantom limb pain. Despite the difficulties with the model, Gate Control Theory still provided a much more integrated theory and increased academic knowledge beyond the purely biological paradigm.

2.2 Stress/Diathesis Model

The Stress/Diathesis model is the idea that precipitating psychological and biological vulnerabilities can be triggered and cause catastrophic thinking and maladaptive behaviour. Turk (2002) introduced the stress-diathesis model including actual or perceived trauma which leads to fear of pain, avoidance and subsequent disability. The

Stress/Diathesis model proposes that self-efficacy interacts with catastrophising, impacts directly on escape and avoidance behaviours and as a result impacts on long term disability. It proposes that a range of cognitive, affective and behavioural factors are related to the perception of pain, maintenance of pain and disability, exacerbation of pain and response to treatment. Although this model is similar to the fear/avoidance model proposed by Vlaeyen et al (1995) in the Stress-Diathesis model a critical role is given to self-efficacy which Turk (2002) believed was mediating the effects of catastrophising and escape avoidance behaviour on disability. This has important clinical implications as if self-efficacy is mediating the effects of catastrophising and escape avoidance behaviour then clinical psychologists need to consider the way in which they work with these concepts. It also suggests that in helping patients become more self-efficacious it will therefore reduce their fear/avoidance behaviours. There are however, some difficulties with this model. Most noticeably, it considers that self-efficacy is a fairly stable construct and does not give room for this to change across time and across situations, meaning that a person may be generally very self-efficacious, but struggle with pain management as they have low self-efficacy for pain management. The Stress/Diathesis model also emphasises the interaction of predisposing factors with a trauma and not all chronic pain patients have their pain following trauma. Many people suffer from chronic pain due to disease, conditions such as arthritis and other health complaints that do not follow from trauma or injury. The Stress/Diathesis model does not make explanation for these sub groups of chronic pain patients.

Bandura (1977) proposed that a prerequisite for engagement in a given behaviour is to have sufficient confidence in the ability to do the given action. He argued that it is a

person's self-efficacy beliefs which determine whether that behaviour will be initiated and completed. Turk and Okifuji (2002) argue that people who feel more self-efficacious are more likely to persist in the presence of obstacles and aversive consequences than those who possess less self-efficacy.

Within the Stress/Diathesis model the belief is that the diathesis of longitudinal issues may lower or raise the threshold to engage in self destructive behaviours. This is then impinged upon by stressors or a trigger which precipitates the maladaptive behaviour. Within a chronic pain context, this is often fear of movement, leading to withdrawal from movement altogether and extended rest. Factors related to the threshold include genetic predispositions, personality traits and the presence or absence of ongoing support systems. This model has proven to be a useful paradigm for understanding how stress and individual differences such as depression may play a role in chronic pain (Banks & Kerns, 1996; Monroe & Simons, 1991). Asghari and Nicholas (2006) in their prospective study found evidence to support the hypothesis that pre-existing personality traits placed some patients at risk for poor adjustment to chronic pain. However, nothing was done to control for the ways in which life events could mediate these personality traits and they took traits as stable and consistent to the person rather than transient and changeable across time and contexts. Their statements should therefore be evaluated with caution until further research can shed further light on how much pre-existing personality traits might influence adjustment to chronic pain.

The Stress/Diathesis model has proven to be a useful paradigm for understanding how stress and individual differences such as depression may play a role in chronic pain

(Banks & Kerns, 1996, Monroe & Simons, 1991). However, it does not take into account how some individuals are perceived as having had no traumatic past life events and no specific trauma or injury and yet still go on to develop chronic pain and the associated difficulties with this. It also does not explain the vast individual differences reported between people with the same condition.

2.3 Biopsychosocial model of chronic pain

This term was first proposed by Engel (1977) and is important as it not only acknowledges biological components of pain but also highlights the importance of experiential components in the way in which people understand and react to their pain. In a biopsychosocial model of pain, biological aspects are the medical and physical aspects of pain, psychological aspects refers to the mental, emotional and behavioural facets and social refers to the context in which pain is experienced. The biopsychosocial model states that ill health and disease are the result of an interaction between biological, psychological and social factors. Unlike the biomedical model, the biopsychosocial model is a holistic perspective in that mind and body are seen as automatically and intricately intertwined. This opened the door for psychological approaches to start making significant differences to the lives of people living with chronic pain. The Pain Clinic within which the current research was undertaken encompasses a biopsychosocial model of chronic pain. The biopsychosocial model of chronic pain built upon the Gate Control Theory as it was the start of our understanding that pain is more than a physical sensation and that other factors change and shape the way in which people experience pain.

Within a biopsychosocial model it is believed that clinicians should aim to help patients to change their ability to cope, inherent belief systems and their behavioural and social processes associated with being ill. It is believed that this will bring about positive changes in the ways in which ill health is understood and dealt with (Keefe & France, 1999). This is alongside helping the patient with the biological aspects of their pain. In the biopsychosocial model of pain no single factor alone can explain individuals' experience of pain (Turk, 1996, Turk and Okifuji, 2002). Biological, psychological and contextual factors all interact together and are closely linked in the experience of pain. This is directly opposed to the biomedical model which has largely prevailed over the last two decades and describes "disease" as resulting from injury or inheritance (Alonso, 2003). A biomedical model has its roots in the Cartesian division between mind and body whilst a biopsychosocial model seeks to combine them as one experience with many facets (Engel, 1977).

2.4 Fear/Avoidance Model

Fear avoidance models have been developed to describe the relationship between chronic pain, anxiety and depression (Lethem et al, 1983; Vlaeyen & Linton, 2000; Vlaeyen et al, 1995). These models postulate that pain catastrophising (anxious thoughts associated with loss of control, hopelessness and external locus of control) causes people to have a fear of movement in case this causes injury or further injury. Chronic pain patients then begin to display overt avoidance behaviours and this leads to disuse, disability and psychological distress. The effects of this are all encompassing in terms of being biological, psychological and social. Prolonged inactivity increases

weakness and causes loss of muscle mass and endurance as well as reduced aerobic capacity (Mayer and Gatchel, 1988, Verbunt et al, 2003). Psychologically, people begin to despair and levels of anxiety and depression increase. Socially, people begin to lose valued roles and places within families and societies. Vlaeyen et al (1995) proposed a model with a direct causal relationship between catastrophising and fear avoidance. However, this was later refined (Vlaeyen & Linton, 2000) into a modified version of the fear of movement and (re)injury model arguing that fear increases hypervigilance related to threat signals and postulated catastrophising as a consequence of a primary appraisal of threat. However, Vlaeyen and Linton (2000) did not discuss the mechanism which links hypervigilance to catastrophising, fear of pain and avoidance. It is interesting to note that this model still does not account for such variations in individual differences in reaction to painful stimuli and further work is needed to understand the links between the different constructs and how and why people respond in the manner in which they do.

Fritz, George and Delitto (2001) reported that fear of pain and subsequent avoidance predicted prolonged work absence and future disability in a sample of low back pain patients. The authors suggest that fearful beliefs about pain might be a predisposing factor contributing to transition from acute phase to chronic phase. However, they highlight that further research is needed to either confirm or deny this idea.

2.5 Neuromatrix Theory

The neuromatrix theory was proposed by Melzack (1999) and is based on the assumption that the experience of pain is generated by distinctive patterns of nerve activation within a neural network called “body-self neuromatrix”. Every person has a different and unique neuromatrix and this is primarily genetically determined even before birth. The Neuromatrix Theory of pain provides a new conceptual framework to examine the problem of understanding the complex relationship between chronic pain syndromes and psychological stress which at present is poorly understood (Melzack, 2005).

Neuromatrix Theory provides a platform for understanding that every person has a different experience of pain. Building upon Gate Control Theory, this theory postulates that sensory and evaluative processes can exaggerate or suppress the experience of pain. Neuromatrix Theory guides us away from the Cartesian concept of pain as a sensation produced by injury, inflammation or other tissue pathology and towards the concept of pain as a multi dimensional experience produced by multiple influences. This theory is an extension of the original Gate Control Theory (Melzack and Wall, 1965). As a relatively new theory, there is still much work to be done in understanding the intricacies of these mechanisms. The medical and psychological sciences of pain are still evolving and as we understand more about the genetic, endocrine and psychological systems all of these factors may contribute to our understanding of the neuromatrix and the ways in which it affects our understanding of pain and chronic pain specifically.

2.6 Summary

As more work on the complexities of pain have been undertaken so our understandings of how such mechanisms may work has deepened. There is still much that science cannot explain about chronic pain and the pain experience. Cartesian models of pain examined a straightforward pain as equal to stimulus model. Although these were not complex enough to encapsulate the experience of pain, they were the beginnings of interest in and research about the pain experience. Gate Control Theory (Melzack & Wall, 1965) was the beginning of interest in how both the physical and psychological aspects of pain interact and how our psychological state can alter our pain perception. The Stress/Diathesis models started to examine further the relationship between the context in which we experience pain and our reactions to this pain. The Biopsychosocial Model (Engel, 1977) encapsulated biological, psychological and sociological aspects into the pain experience. Fear/Avoidance models gave psychologists a solid cognitive basis for research and sparked much interest and research into these variables. Neuromatrix Theory built upon both Gate Control Theory and our increasing knowledge of the brain thanks to neuroimaging techniques. As theories and models of pain have evolved, psychological aspects of pain have taken an increasingly important role in understanding the pain experience. Psychological aspects of chronic pain have become increasingly important in the way in which we understand chronic pain.

Chapter Three: Psychological Aspects of Chronic Pain

With these theories in mind, several different modes of therapy have been proposed to help people suffering from chronic pain. The psychological aspects of chronic pain that are currently receiving the most interest and research are catastrophising and acceptance. These two concepts are examined and the therapies that work within these theoretical frameworks are also discussed. This is not an exhaustive list of therapies used for chronic pain but rather an outline of the predominant theoretical bases and the ones that are most relevant to the undertaking of this piece of research.

The role of cognitive factors in the clinical presentation of chronic pain has been well documented within the literature. It has been found that cognitions influence reported levels of pain, levels of disability and treatment outcomes (Flor & Turk, 1988; Jensen, Turner, Romano & Karoly, 1991; Turk & Rudy, 1992). The primary way in which clinical psychologists begin to work within a cognitive framework with patients with chronic pain is through Cognitive Behavioural Therapy (CBT). CBT has a considerable evidence base for use with chronic pain patients and is therefore the common standard of psychosocial intervention for chronic pain patients (Morley, Eccleston & Williams, 1999). As a therapy it attempts to help patients look at their erroneous thoughts and beliefs and asserts that a change in these will lead to a change in the behaviours that maintain the persons' difficulties. Morley, Eccleston and Williams (1999) conducted a systematic review and meta-analysis of randomised control trials of Cognitive-Behavioural and Behavioural therapies for chronic pain and concluded that these treatments were effective when compared to waiting list conditions. A cognitive approach helps patients to understand the psychological factors underlying and

maintaining their difficulties and helps them to change these. Maladaptive cognitions and behaviours are focused upon as the core of the therapy. The concept is that in aiding patients to understand how they are affecting their pain the therapist can help them to understand how best to learn to live with chronic pain. However, Acceptance and Commitment Therapy (ACT, Hayes, Strosahl & Wilson, 1999, Hayes & Smith, 2005) has been looking more at acceptance of the pain being there in order to live as full a life as possible in the face of intractable pain. Both of these approaches are discussed in light of the literature base and in light of the core cognitive aspects that they claim to be working within.

3.1 Catastrophising

Arntz and Classens (2004) found that thoughts, beliefs and appraisals of the pain experience influenced pain intensity. Findings such as these indicate CBT, which works within these underlying processes, should therefore be effective when working with this population. Cognitive models of chronic pain have been well researched and documented. Of all the cognitive errors, catastrophising has perhaps been the most studied. Catastrophising is a cognitive process associated with maladaptive distorted thinking. It is a particularly important variable to understand because it relates to greater healthcare utilisation and use of pain related medications in the general public, even after controlling for pain intensity (Severeijns et al, 2004). Sullivan et al (1995) defined catastrophising as an exaggerated orientation toward pain stimuli and pain experience. Similarly, Chaves and Brown (1987) defined catastrophising as the tendency to magnify or exaggerate the threat value or seriousness of the pain sensations.

The authors arrived at this definition following asking patients undergoing a stressful dental procedure to report the thoughts and images they experienced or the strategies they engaged in during the procedure. They examined the spontaneous cognitive strategies employed by 75 patients undergoing the procedure and elicited these strategies using a structured interview. Chaves and Brown (1987) found that those with high scores of coping reported less stress than catastrophisers but did not report less pain. This suggests that although the pain level is perceived as similar those who tended to catastrophise experienced significantly more distress by the pain than did those who did not catastrophise.

Sullivan, Bishop and Pivik (1995) found that catastrophising predicted increased pain intensity and emotional distress. Catastrophising is also closely linked with anxiety and depressogenic schemata and is often found to be a feature of these difficulties. After controlling for pain severity, pain beliefs and cognitions were found to significantly predict general activity levels and emotional distress. Negative thoughts and negative self statements in particular are found to influence outcome (Stroud, Thorn, Jensen et al, 2000).

Lamé et al (2005) reported that pain catastrophising was the single most important predictor of quality of life in their chronic pain sample. Using a multiple regression analysis they studied pain intensity, pain coping and beliefs, pain catastrophising and eight domains of quality of life. Their finding that pain catastrophising showed the strongest association with quality of life, even stronger than pain intensity highlights how important pain catastrophising is for this population. This finding also highlighted

that it is arguably the appraisal rather than the actual experience of pain that is important. Catastrophising has been found to be related to higher pain severity amongst patients with chronic arthritic joint pain (Keefe et al, 1997, 2000). These findings suggest that clinical psychological intervention is particularly important as it can reduce catastrophising cognitions (e.g. Jensen et al 2001, Burns et al, 2003) and therefore potentially improve levels of reported pain and quality of life.

There is some disagreement in the literature about whether catastrophising is a stable personality trait and therefore consistent over time and situations or something transient and pain specific that can be changed (Turner and Aaron, 2001). Ellis and D'Eon (2002) found that almost half of people classed as catastrophisers stayed within that classification across two different pain situations (experiencing headache pain and a finger-pressure procedure). However, the finding that over half of the sample changed from a catastrophising style during the experience of headache into a non-catastrophising style during the finger-pressure test is perhaps a finding that should be interpreted with caution. It is likely that real life headache pain is very differently conceptualised than is experimentally brought about pain as part of a research study. It may also suggest that the measure used was perhaps unreliable. The Ellis and D'Eon (2002) study may also point to the fact that catastrophising is a situation dependant state rather than a personality trait which would be stable across time and situations. Most other studies start with the assumption that catastrophising is relatively stable but this research seems to suggest that this may not be the case.

Another psychological variable that has received considerable interest is coping. Coping involves cognitive or behavioural responses to a stressful situation. These strategies can be either adaptive (helpful) or maladaptive (unhelpful). Coping represents attempts to reduce pain or stress related to pain (Larazus & Folkman, 1984). Within a cognitive conceptualisation of chronic pain, it is assumed that the necessary preconditions for a patient to engage in any sort of adaptive coping include the cognitive processes conducive to those coping efforts. A study in Belgium found that many people (whether they had back pain or not) believed that back pain is a result of injury, that movement is likely to exacerbate the condition and that rest and pain medications are the best treatment options (Szpalski, Nordin, et al, 1995). If a back pain patient held such a belief, then a coping strategy would most likely be to rest as much as possible and take medications. This is contradictory to what we understand about back pain which is that the less people move about the worse the prognosis for long term pain becomes. Coping strategies can be moulded by what people believe and think about their pain and its aetiology. CBT asserts that changing maladaptive beliefs to be more adaptive will help to bring about changes in the ways in which they respond to their pain. Coping with pain involves any adaptive behaviour which is directed towards either lessening of the pain experience or managing tasks in spite of the pain being present. Esteve, Ramirez-Maestre and Lopez-Martinez (2007) found that when active coping is practiced, levels of depression were reduced. This study utilised a structural equation modelling technique with 117 chronic pain patients and found that coping measures had a significant influence on measures of emotional distress. They also found that resourcefulness beliefs had a significant influence on depression, reducing levels of reported depression within the sample. The more resourcefulness beliefs

people reported, the less depressed they reported to be. Resourcefulness beliefs are the belief in controllability and predictability of pain. This study appears to show that having beliefs about being resourceful counteracts depression for people with chronic pain.

Helplessness as a cognitive construct is relatively understudied. Within a chronic pain population helplessness is the belief that one's pain is insurmountable and that the individual is unable to have any effect upon their pain. It is the idea that the person is unable to either solicit help from others or to help themselves. Unlike catastrophising and to a lesser extent, coping, as a variable this has not been well studied within a chronic pain context.

The idea of enmeshment of self identity with pain has recently been of interest to researchers. Enmeshment with pain is the idea of how fused a person is with their pain and how able they are to see their pain as a discrete and separate entity to themselves. It is a measure of a person's self identity – their sense of who they are and what they might become, or their “possible selves” (Morley, Davies & Barton, 2005; Morley & Eccleston, 2004, Pincus & Morley, 2001). When people suffer from chronic pain they sometimes become fused with their pain and with the idea that their pain is something about them that cannot be extricated from their self identity. The experience of entrapment relates not only to the sufferer's current experience of their sense of self, but also to their anticipations of future experiences of themselves and their pain (Hellström, 2001). Morley, Davies and Barton (2005) conducted a study examining 89 chronic pain patients and their levels of self pain enmeshment, depression and acceptance. The

authors found that the proportion of hoped for self characteristics that could be achieved even with the presence of pain predicted the magnitude of depression and acceptance scores. That is to say that the more participants were enmeshed with their pain and considered their future selves to be conditional on the presence or absence of pain the worse the outcome measures became. People reported higher levels of depression and lower levels of acceptance when their self identity was more enmeshed with the pain experience.

3.2 Acceptance

Cognitive behavioural therapy has traditionally been the approach taken when working in a cognitive framework with patients with chronic pain. However, a recent movement has been changing the way psychologists conceptualise chronic pain and the most effective way to help to treat the difficulties people encounter because of their chronic pain. Acceptance is emerging as a valuable concept in contemporary theories of patients' adjustment to chronic pain (McCracken et al, 2004). Acceptance of pain includes responding to pain related experiences without trying to control or avoid the pain. This is particularly important when these attempts have limited the patients' quality of life and ability to engage in valued activities and reach personal goals regardless of these experiences (McCracken & Eccelston, 2005). Acceptance based interventions attempt to teach patients to feel emotions and bodily sensations more fully and without avoidance and to notice fully the presence of thoughts without following, resisting, believing or disbelieving them (Hayes, Strohal & Wilson, 1999). This is in

direct contravention to CBT which specifically aims to change the patient's thoughts and beliefs which are viewed as erroneous.

In order to address the difficulties of acceptance within this population a new therapy, Acceptance and Commitment Therapy has been conceptualised. The aim of Acceptance and Commitment Therapy with chronic pain patients (Dahl, Wilson, Luciano & Hayes, 2005) is to help the client to develop greater psychological flexibility in the presence of thoughts, feelings and behaviours associated with pain. ACT aims to increase psychological flexibility using six core processes or psychological skills: acceptance, defusion of inflexible cognition, being in the present moment, self as context, clarifying values and committed action (Hayes, 2004). ACT is particularly important to this thesis as the concept of acceptance was of particular interest to the researcher. In order to explain acceptance, many therapists use the metaphor of chronic pain as being akin to quicksand. The more that the patient struggles frantically to escape the quicksand, the more that it grips them and pulls them down. Within an ACT framework, this metaphor is used to help patients learn that the only way to escape the quicksand is to stop struggling and start to work with the quicksand instead. It suggests that the individual should neither ignore nor indulge their pain and try to live life to the fullest given that they suffer from pain. Acceptance based therapies aim to help the patient to accept their current situation and work within the framework that they are presenting with. Although experiential avoidance is effective in the short term, in the long term it seriously affects quality of life for chronic pain sufferers. Many of the actions of people with chronic pain are aimed at avoiding pain sensations, emotions or thoughts but paradoxically it has been widely found that avoidant behaviour leads to further

disability (e.g. Phillips, 1987, Vlaeyen & Linton, 2000, McCracken, 2005). Some authors have termed the use of an acceptance based model when working with people with chronic pain Contextual Cognitive Behavioural Therapy (McCracken, 2005).

The ACT (Hayes, Strosahl & Wilson 1999; Dahl, Wilson, Luciano & Hayes, 2005) approach to pain involves two primary concepts. The first is that patients must accept the aspects of their pain that they cannot change, including all of the difficult thoughts, feelings and bodily sensations that accompany their pain. The second is that this acceptance allows the patient to open a space where they can commit to acting in ways that make them feel vital and energised and leads to engagement in behaviour that moves people in the direction of valued life domains, such as intimate relationships, family, work, community participation, self-growth and learning. ACT is based on an extensive programme of psychological science which is both basic (Hayes, Barnes-Holmes & Roche, 2001) and applied (Hayes et al, 2006).

Although a fairly new form of therapy there is some evidence supporting the efficacy of this approach to improve emotional and physical functioning in chronic pain patients (Vowles & Sorrell, 2004). A preliminary study examining the effectiveness of acceptance based treatment for complex and long standing chronic pain patients demonstrates significant improvements in emotional and physical functioning both immediately after the intervention and at follow up (McCracken, Vowles & Eccleston, 2005).

McCracken and Eccleston (2005) conducted a prospective study and found evidence to support the strong relationship between acceptance of pain and healthy functioning that had been found in previous cross-sectional studies. So it would appear that acceptance has emerged as a psychological factor that has a crucial role within chronic pain and how patients begin to adjust their lives to live with pain. A recent study by Viane, Crombez, Eccleston, et al (2003) found evidence to support the notion that acceptance is an important predictor of mental well being in chronic pain patients with fibromyalgia. They found that acceptance predicted mental well being beyond the effects of pain catastrophising and severity of pain. This is in direct opposition to findings that catastrophising is the most important predictor of poor outcome. However, this study was only with fibromyalgia patients and therefore should be interpreted with caution. There may be something different and particular about acceptance within this group of patients that does not generalise to other chronic pain conditions.

Several studies have demonstrated that pain acceptance exerts a greater influence on adjustment (measured by levels of reported anxiety and depression) than coping and pain-related cognitions (McCracken & Eccleston, 2003, 2006). Pain acceptance is the only one of these three strategies (acceptance, coping, and pain related cognitions) that is not directed towards thinking about and maintaining attention on the pain.

Acceptance takes the person not to ignoring the pain, but simply to being open to it being there. In their 2003 paper, McCracken and Eccleston speculate that although catastrophising and acceptance have the common belief that pain will continue, in acceptance this acknowledgement is neutrally valued as a willingness to live with pain. In catastrophising this acknowledgement is characterised by a sense of helplessness.

However, CBT is not solely about either coping or catastrophising and at present there is no clear literature on whether ACT or CBT might be better suited to a chronic pain population. Certainly, CBT has a very large evidence base and the literature to support an ACT based approach to chronic pain is growing, although still in its infancy. However, there is a lack of clarity about which mode of therapy might explain more of the underlying psychological processes in chronic pain. Finding evidence to examine whether catastrophising or acceptance might better moderate anxiety and depression due to chronic pain was one of the aims of this research.

3.3 Summary

This chapter has examined the different models used within a chronic pain setting. Although there are differences between the different models there is also considerable agreement between them. All the models include an important role of fear of pain and (re)injury and subsequent avoidance behaviour. It seems as though these constructs are vitally important to understandings of the psychological mechanisms at work within chronic pain and how we might begin to work with what patients present in clinic settings. Both CBT and ACT work within a behavioural model of chronic pain and both have some evidence showing that they are effective in working with these patients, the evidence base for CBT being stronger than for ACT based approaches. However, at present there is a lack of definitive evidence showing which mechanisms are mediating outcomes. Research is made difficult by the overlap of these variables and their relationship both with outcome variables and with each other.

Chapter 4: Imagery and Pain

4.1 Use of Imagery in Pain

There is relatively little literature examining the use of imagery within a chronic pain population. Literature in the fields of Psychosis and Post-Traumatic Stress Disorder (PTSD) both have extensive empirical support documenting imagery as part of the symptoms of the disorders. Indeed intrusive imagery of traumatic events is viewed as one of the defining symptoms of PTSD (Brewin, 1998). Recent work has indicated that imagery may be involved in the development and maintenance of psychotic symptoms particularly with hallucinations and delusions (Morrison, 2004). Morrison, Wells and Northard (2002) found that 75% of psychotic patients could identify images that occurred spontaneously in relation to their delusions and hallucinations. In the context of psychosis and PTSD imagery is often a negative experience associated with distress. This context is very different from the context in which imagery is being described herein and was therefore not included in the present study.

The primary focus of research on imagery within a chronic pain setting have been studies examining imagery as a part of relaxation and how imagery based strategies may aid patients in learning to relax and incorporating this technique into their daily lives. Fundamentally the premise of imagining is that in by imagining something we are able to elicit physiological and emotional arousal to the imagined stimulus as if it were real. However, it must be noted that imagery and imagining are not the same thing. It is possible to imagine sensations other than in a visual context (touch, smell, sound and taste) whereas imagery refers only to visual images seen in the minds eye. Guided imagery is the most commonly reported imagery technique. The operating premise is

that psychophysiological disorders can be resolved through the inner capacity for self-healing inherent within the individual once this capacity is directed in the appropriate way through guided imagery. Several studies have found that guided imagery can be effective in reducing reported pain and discomfort levels in acute pain. Guided imagery has been found to reduce perioperative symptoms (Tusek et al, 1997 & Rampkin et al, 1991), cancer pain (Sloman, 1995) and chemotherapy-related nausea and vomiting (Troesch et al, 1993). However, these are all acute pains and therefore the results may not be applicable to chronic pain where the psychological understandings of pain are very different.

Alden, Dale and DeGood (2001) examined the interactive effects of the affect quality and the directional focus of mental imagery on pain analgesia. Again this was examining pain induced in a laboratory setting (cold compressor test) and not with chronic pain patients in real life settings. However, this study is of particular interest as the authors examined both positive and negative imagery and the directional focus of the imagery (internal and external). The authors found that positive affect imagery combined with externally focused imagery resulted in the lowest reported pain. The study suggests that the content of peoples' imagery can have an influence on their pain and their subjective experience of pain. However, results must be interpreted with caution as the pain was again acute laboratory induced pain.

One study that has examined the effects of guided imagery on chronic pain looked at quality of life for patients with chronic tension type headache. Mannix et al (1999) found that reported quality of life was significantly improved for patients given a guided

imagery tape to listen to. Frequency of headache was significantly reduced as was headache severity for those completing the guided imagery. This study is particularly interesting as it examines quality of life rather than just a reduction in symptoms for patients. The primary goal of living successfully with chronic pain is centred on attaining the highest quality of life in the presence of a chronic pain condition. Mannix et al (1999) postulate that guided imagery is a cost effective adjuvant therapy to the usual treatments for chronic tension type headache. It would seem possible that these findings might generalise to other causes of chronic pain and not just be headache-specific. Baird and Sands (2004) investigated guided imagery within osteoarthritis (a chronic condition known to cause pain) using a longitudinal, randomised clinical pilot trial. The authors found that their treatment group reported a significant reduction in pain and mobility difficulties compared with the control group. Although this was only a pilot study with 28 older adult female patients, results are encouraging about the positive effects of guided imagery and progressive muscle relaxation.

Fernandez and Turk (1989) conducted a meta-analysis and found that for reducing pain in a variety of experimentally induced pain conditions, imagery was the most powerful psychological strategy utilised. The majority of studies included in this meta-analytical study were using pain induced in a laboratory, rather than chronic pain experienced within a clinical sample. The authors reasoning for this was that it is too complex to differentiate the many variables at work cognitively within a real life sample. The cognitive mechanisms and underpinnings of induced pain within a laboratory setting and those of a chronic pain population are likely to be vastly different. Although some studies pertaining to real life pain conditions were included in the meta-analysis, some

of these included children (e.g. Fowler-Kerry & Lander, 1987) and it is therefore not unreasonable to assume that children would be more likely to use imagery techniques than adults. However, there is very little literature to support or disconfirm this hypothesis. The results must therefore be interpreted with caution in light of their generalisations to a chronic pain population. Despite these difficulties the results are consistent with the chronic pain controlled trial by Turner and Jensen (1993) where all three treatment groups (relaxation with imagery, cognitive training, and cognitive training plus relaxation with imagery) reported similar reductions in pain compared to untreated patients.

Despite this body of work on guided imagery there is virtually nothing examining spontaneous imagery within this population. Although guided imagery and spontaneous imagery obviously have some similarities, it is unclear what differences they also have and how they might interact with one another. It is also unclear whether there are differences in guided imagery ability and results between people who do and do not have spontaneous images.

Relatively little is known about what happens within the brain when images are being produced. Cui et al (2007) used functional magnetic resonance imaging (fMRI) to study the association between early visual cortex activity relative to the whole brain while participants visualised either themselves or another person bench pressing or stair climbing. It was found that reported image vividness correlates with the relative fMRI signal in the visual cortex. Thus it would seem that individual differences in the vividness of visual imagery can be measured objectively. This finding suggests that

there is something inherently different in the ways in which those with vivid images code and conceptualise their images. Indeed, Hugdahl et al (2001) studied a single patient with an amputated arm whilst the patient was placed in a functional magnetic resonance imager or fMRI scanner. The authors concluded that areas activated during actual motor execution to a large extent are also activated during mental imagery of the same motor commands. Furthermore, they conclude that adding instructions about pain together with imagining moving the fingers intensified the activation compared with adding instructions about non painful experiences. These findings suggest that we can bring about pain by thinking about it. In turn, this implies that we may be able to reduce pain by guiding our thinking in a certain direction. However, Hugdahl et al (2001) utilised only a single n design and therefore it would be unwise to make broad generalisations about this finding and about whether they may be representative of the chronic pain population as a whole.

The aforementioned studies led to the present methodology being conceptualised in order to understand more about the presence or absence of imagery within chronic pain patients and how, if at all, this affects functioning. It was also a goal to attempt to understand more about the psychological mechanisms underlying the difficulties associated with chronic pain. The debate about catastrophising and acceptance was something that was of particular interest.

4.2 Hypotheses

The research question is two fold; firstly, whether the presence of mental imagery has an impact on patients' emotions, cognitions, physical abilities and pain levels and secondly, whether cognitions or acceptance better explain distress in chronic pain. In terms of emotions, it was decided to look at depression and anxiety as these are the two primary problems that patients present with in the clinic. Catastrophising and acceptance were both included in the study as it was felt that there may be something that each of these constructs could add to our knowledge of CBT and ACT as they are used with this population and the manner in which the underlying psychological mechanisms may work. In order to answer these questions, the following were selected as hypotheses that might help us to better understand the research questions.

Hypothesis 1

Chronic pain patients who report mental images of pain will report higher levels of anxiety.

Hypothesis 2

Chronic pain patients who report mental images of pain will report higher levels of depression.

Hypothesis 3

Chronic pain patients who report mental images of pain will have a lower level of physical functioning.

Hypothesis 4

Chronic pain patients who report mental images of pain will report a range of maladaptive cognitions.

Hypothesis 5

There will be a stronger relationship between acceptance and distress than between catastrophising and distress.

Chapter Five: Methodology

5.1 Setting

The chronic pain team within which the present research was undertaken consists of four whole time equivalent (WTE) consultant anaesthetists, a clinical nurse specialist (0.8 WTE), a clinical psychologist (0.4 WTE), a trainee clinical psychologist (0.6 WTE), a hypno-therapist (0.1 WTE), an acupuncturist (0.1 WTE), and an aromatherapy massage specialist (0.2 WTE). Approximately 720 new patients are seen by the team every year, which equates to 18 new patients every working week. All referrals to clinical psychology are generated by the consultant anaesthetists who assess the patients and then decide which service route would be best placed to meet the patient's current needs. The vast majority of patients are out patients, with only 3-4 inpatients seen every week. Generally, inpatient referrals come from the surgical or general ward teams. Outpatient referrals to the pain clinic typically originate from the patient's General Practitioner.

Geographically the chronic pain service covers a very large and diverse locality. Urban and rural areas are represented and the region varies widely in terms of socio economic status. Occasionally referrals are taken from out of area if there are procedures available here that cannot be undertaken in the patients' own health board area.

5.2 Design

The research was a quantitative study carried out using postal questionnaires. It was a between subjects design with ad hoc inferential statistics.

5.3 Inclusion Criteria

All patients with a diagnosis of Chronic Pain who attended the Chronic Pain Service clinics were included unless they met the exclusion criteria. The service sees patients from the age of sixteen upwards and as a result all ages over 16 were included in the study. Both men and women were included.

5.4 Exclusion Criteria

Patients were excluded if they had pain from a malignant condition such as cancer. It would in any case be very unlikely that these patients would come through the chronic pain clinic as they would be seen by specialist palliative care teams. Excluding terminally ill patients is consistent with the chronic pain literature in which terminal pain patients are almost always excluded. Those with a diagnosis of psychotic illness were also excluded, as these individuals may have a different perception of the mental images discussed in this study. Any person not fluent in the English language was also

excluded as it was felt that they may not be able to understand the questions that were being asked. Children (under 16 years old) were also excluded from this study.

5.5 Sample

A power calculation was conducted to work out how many participants would be needed (Cohen, 1992). In the absence of a literature base, a medium to large effect size was predicted between those who do and do not have images of their pain. This was primarily based upon clinical observation of the reporting of these images. Therefore a total of 30 within each group was aimed for. One group was smaller than what we had aimed to recruit as the imagers group contained only 19 (although the non-imaging group was much larger than originally expected with an N=64).

A recent study examining return rates of postal questionnaires in health care settings found that approximately 21% of people responded (Harrison and Cock, 2004). Based on this study, it was conservatively estimated that 21% of chronic pain patients would respond and therefore 350 questionnaire packs were sent out to patients who attended the clinic in January 2006 to ensure that the study was sufficiently powered. A 21% return rate of the 350 packs sent out should yield approximately 73 replies. A total of 83 responses were received (representing a response rate of 23%).

5.6 Ethical Suitability

Ethical permission was sought and granted from the local Research Ethics Committee (a copy of the approval letter can be found in Appendix I). The local Health Board

Research and Development Department also gave permission for the research to be conducted within the health board area (a copy of the approval letter can be found in Appendix II). The research was also reviewed and scrutinised by Edinburgh University who gave their permission and support for the project.

The primary ethical issues were whether participants would be distressed by the study and whether they might be concerned that their treatment at the service may be compromised should they not wish to participate. In terms of participants being distressed by the study, it was hoped that this would be overcome by making it explicitly clear that there was no pressure to complete the study and by giving full contact details of the researcher should they wish to discuss anything about the study. Several patients took up this offer and discussed the study and the implications for taking part with the researcher before choosing whether or not to participate. It was made clear on the information sheets (in Appendix III) sent to participants that their decision about whether to participate would have no bearing on the treatment that they receive from the Chronic Pain service. Clinicians would not have been aware of their choice of participation due to the postal questionnaire design therefore it would not have had a bearing on their care or treatment. Another ethical consideration was whether participants might be concerned about their anonymity being protected. The participant information sheet reiterated that anonymity was of the utmost importance and that all questionnaires would only be identified by a number, with no identifying details remaining on the questionnaires. These ethical considerations were discussed in depth with the local ethics committee and approval was granted before the study commenced.

5.7 Collection of Data

The questionnaire packs were piloted on five patients attending the clinical psychology service. From piloting it was estimated that it would take most people an average of 45 minutes to complete the questionnaire pack.

During the data collection phase, case note files for patients were used to obtain patient addresses and questionnaire packs were sent out. The case notes selected were those in the clinic lists attending the chronic pain clinic seeing any of the professionals within the multi-disciplinary team, not just clinical psychology patients. Case files were used to screen for those who may meet exclusion criteria and packs were then sent out to every person who met inclusion criteria. A total of 350 questionnaire packs were mailed out.

5.8 Procedure

The research was conducted by postal questionnaire. Prior to receiving the questionnaires participants would not have known about the research. 350 patients who attend the Chronic Pain Service were sent a questionnaire pack, demographics information sheet and a participant information form (Appendix III). Participants were selected from the clinic lists of those attending the service in the month of January, 2007. The first 350 files were taken and names and addresses copied by hand onto an envelope in order that packs could be sent. Stickers were affixed onto case files in order that all professionals dealing with the patient would know that the patient had been included in the study. The packs also contained a stamped and addressed envelope for

returning the completed questionnaires. The researcher's name and contact details were stated and participants were encouraged to be in contact should they have any questions regarding the research. The questionnaire packs contained the following measures.

Chronic Pain Acceptance Questionnaire (CPAQ, McCracken et al, 2004)

This is a 20 item measure of acceptance of chronic pain. It has two subscales; pain willingness and activities engagement. Questions are based on a 7 point scale from "*Never True*"(0) to "*Always True*" (6). Although this is a relatively new scale, some work has already been undertaken to examine the constructs and viability of the measure. The CPAQ demonstrates very good to excellent internal consistency, with alphas of 0.82 (Activities Engagement) and 0.78 (Pain Willingness). It also shows moderate to high correlations with measures of avoidance, distress and daily functioning. The two factors of the CPAQ (pain willingness and activities engagement) have been found to significantly predict pain-related disability and distress, thus demonstrating predictive validity (McCracken et al, 2005). Data from several studies demonstrate that the measure total scores are correlated with standardised measures of emotional distress and daily functioning and therefore support its validity as a measure of acceptance within a chronic pain population (McCracken, 1998; McCracken et al, 2004).

Acceptance and Action Questionnaire - Revised (AAQ-R, Hayes et al, 2004)

The AAQ-R is currently the only assessment tool that specifically measures the construct of experiential avoidance. The primary AAQ-R validation study (Hayes et al, 2004) suggested that the AAQ-R is an internally consistent and valid scale which is

useful in the measurement of experiential avoidance and psychological acceptance in a chronic pain population. The measure contains 9 items which respondents must rate on a scale of 1, “*never true*” to 7 “*always true*”. It is not a specific measure for a chronic pain population but rather measures acceptance as a more general concept. The AAQ is a generic measure of experiential avoidance and the ability to do things in the presence of difficult psychological events. The higher the score a respondent receives, the less accepting of their pain this indicates they are.

Hospital Anxiety and Depression Scale (HADS, Zigmond and Snaith, 1983)

This well used measure divides into two subscales; depression and anxiety. It is widely used in health settings as it is not contaminated by features which may reflect illness symptoms rather than depressive symptoms (for example tiredness and changes in appetite). It is therefore particularly useful when working with people with physical illness. There are 14 questions and each question is scored from 0 to 3 depending on severity of symptomatology reported. For both scales, a score of 0-8 is below caseness, 9-11 is borderline and 12+ would imply case-ness. An updated literature review of the factor structure of the HADS (Bjelland et al, 2002) found Cronbach’s alpha for the Anxiety subscale to vary between 0.68 to 0.93 (mean 0.83) and for the Depression subscale from 0.67 to 0.90 (mean 0.82).

Roland and Morris Sickness Impact Profile (R+M SIP, Roland and Morris, 1983)

There are 24 statements and respondents receive a mark of 1 for each item ticked. This is a simple measure where respondents tick a sentence if it describes them. A higher score suggests a higher level of physical disability caused by pain. This scale was

adapted from the original Sickness Impact Profile (Bergner et al, 1981) which was intended for those with back pain only and contained 136 questions. The R+M SIP was found to be valid by Deyo and Centor (1986) who compared it to the original measure. Deyo (1986) also compared the R+M SIP to the complete measure and found the R+M SIP to be more sensitive to change throughout patient follow up and to be more reliable when compared to the physical aspects of the SIP. Jensen et al (1992) studied the validity of the R+M SIP scale for a general chronic pain population and concluded that it was a good measure of dysfunction in chronic pain patients with pain in sites other than the low back as well as those with low back pain. This conclusion was due to test-retest data showing that the scale was generally as reliable as the original SIP.

McGill Pain Questionnaire (Short Form) (Melzack, 1987)

The Short Form of the McGill Pain Questionnaire correlates very highly with the standard McGill Pain Questionnaire and has been adopted for important clinical trials (Terajima & Aneman, 2003). Recent studies have revealed the validity of the structure of the Short Form McGill Pain Questionnaire and its usefulness after translation into many languages (Melzack & Katz, 2001). This scale has 3 separate parts. The first gives 15 words that may describe their pain (e.g. throbbing, shooting, stabbing, etc) and for each word respondents are asked to indicate whether the level of their pain is Non-existent, Mild, Moderate or Severe. This yields a score based on the number of words ticked and the severity ticked for each one. The second part has a blank drawing of a person for respondents to mark or comment on the figure where they have their pain or problems. Lastly, there is a line where respondents are asked to indicate how bad their pain is on a scale from no pain at all to worst possible pain. This also yields a single

score about how bad they believe their pain is. This line is measured with a score being given according to where on the line participants have marked.

Pain Related Control Scale (PRCS, Flor et al, 1993)

This scale measures an individual's beliefs about their ability to cope. It asks 15 questions which people rate from 0 "*no, not at all*" to 5 "*very much*". It divides into two factors, resourcefulness and helplessness. Resourcefulness refers to people's beliefs about the manageability of their pain, predictability of their pain and their control and ability to cope. Helplessness taps into their locus of pain control and hopelessness. The two subscales were found to be valid and sensitive to change whilst being closely related to pain intensity and interference from pain experience (Flor et al, 1993). This measure was developed in conjunction with the Pain Related Self Statement Scale (see below).

Pain Related Self Statement Scale (PRSS, Flor et al, 1993)

This measures an individual's thoughts about pain and divides into two factors: Catastrophising (anxious thoughts associated with loss of control, hopelessness and external locus of control) and Coping (thoughts of coping, predictability and internal control). Both of these subscales were demonstrated to be valid and sensitive to change, and closely related to pain intensity and interference from pain experiences (Flor et al, 1993). There are 18 questions which are rated from 0 "*almost never*" to 5 "*almost always*".

Chronic Pain Imagery

Searches were conducted to determine if there was any existing measure of visual images. The Ovid and Medline databases were searched using the terms “imagery” “measurement” and “chronic pain” and as far as the researcher was able to ascertain there is not a standardised measure of imagery in chronic pain.

There is a measure of vividness of visual imagery which has been standardised, the Vividness of Visual Imagery Questionnaire (VVIQ), Marks (1973). However this does not really include the concept of content of images and is primarily interested in how vivid people’s images are, how pure the actual image is. It was therefore decided to forgo a standard measure and simply ask participants about the content of their imagery. This was not a psychometric tool, but simply a set of questions about their imagery. The questions start with: “Some people report having mental images and/or pictures of their pain, do you have these?”. Participants must then circle either “yes” or “no”. If “yes” is circled, respondents complete the rest of the measure and if “no” is circled then they do not continue. If they respond “yes” the next question asks them to detail these images, giving as much detail as they feel necessary. A question about how vivid the images are asks respondents to rate it from 7 “*perfectly clear and as real as the actual experience*” to 1 “*no feeling present at all, you only ”knowing” that you are thinking of the feeling*”. Respondents are then asked if they experience physical sensations when they have their image and asked to rate this in a line from “not at all” to “very much so”. Next, any emotions that accompany the image are asked for. Duration of the image is probed, with answers being either “moments” “minutes” “hours” or “longer”.

Next respondents are asked about how controllable their image was and asked to mark this on a line going from 0 “completely controllable” to 100 “completely uncontrollable”. Lastly, respondents are asked to indicate how distressing this image is to them by marking on a line scale from 0 “not at all” to 100 “severely”.

This is not a psychometric measure, but rather more of an exploratory look at the images that people with chronic pain experience and the impact that these may have on their emotions. It was also hoped to gain some insight into the actual experience of having these images.

5.9 Data Management

Data was entered into Statistical Package for Social Science (SPSS, Version 12) for reduction and analysis. Data were subsequently checked by hand for any omissions or errors. The main analyses were t-tests and correlations (bivariate and partial).

Chapter Six: Results

Description of Sample

Three hundred and fifty questionnaire packs were sent out and a total of 83 responses were collected, a response rate of approximately 24%. Of these 30 were male (36%), 30 were female (36%) and for 23 gender is unknown due to missing data. The age ranged from 22 to 88 (mean 55.06, sd=15.31). Length of chronic pain ranged from 6 to 480 months (mean 94.71, sd=91.25). 64 people (77%) reported no prior or present mental

health problems, and 18 (21%) reported that they had in the past or did now suffer from a mental health problem. One respondent left this question blank, but was still included in the main analysis. Of the 18 people describing mental health difficulties, 15 of these were relating to depression. The other problems included PTSD, “a nervous breakdown” and anxiety. However, this question may have been misleading for respondents as many lay people associate the term “mental health problem” with psychosis and not with more prevalent mental health difficulties such as depression and anxiety. The relevance of this issue is discussed further in the next chapter.

19 respondents (22.9%) described that they had mental images of their pain. These respondents are subsequently referred to as “imagers” and the images that they reported can be seen overleaf in Table 6.1. Those respondents who did not report mental images of their pain are subsequently referred to as “non-imagers”.

Table 6.1 – Table showing respondents’ description of mental images of their pain

| |
|---|
| Like someone gripping the muscles in their hand |
| Fire or a volcano and lava flowing out from my scar |
| Displaced bone pressing on the nerve and recalling the anatomical distribution of the nerve and how accurate it is represented by the pain I experience |
| Like electric shocks |
| A dark cloud |
| Like someone stabbing and sawing my leg |
| Things under my rib cage that they must be able to remove |
| A lightening bolt |
| That my pain is nerve related and that amputation would not help |
| Like I have a balloon inside me |
| Imagine my pain as a solid mass that I push out of my leg |
| Like a sharp kitchen knife right through my knee |
| It feels like someone has set off a thousand fireworks at once and they won't stop |
| I feel like I am being burned alive |
| Like knitting needles – its point is sharp and pointed and it never stops poking me |
| Flashbulbs to my accident |
| A one on one appointment with Lord Lucifer and his three pronged fork of pain |
| I see my leg as a plastic bottle with one hand clasped tightly around the middle and the other hand twisting the bottle round |
| Hot metal wires jiggling up and down my leg |

As can be seen in Table 6.1 above, the types of images experienced seem very individual and idiosyncratic and don't appear to fall into discrete categories. However,

if it were possible to collect a larger series of images it is possible that categories may emerge.

In terms of the data regarding the standardised measures, the Kolmogorov-Smirnov test indicated that the data were sufficiently normally distributed to justify using parametric tests. Exploratory data analysis and histograms also revealed this to be the case. Clark-Carter (2004) reiterates that data must deviate significantly from normal to warrant using non-parametric tests and this was not the case for this data set.

Standardised mean differences (Cohen's *d*) were calculated using the Dunst et al (2004) guidelines.

Exploratory Analysis

As part of exploring the data set, respondents were divided into two groups depending on whether they did or did not experience mental images of their pain. These two groups (imagers vs non-imagers) were then used as the grouping variable in comparisons of the ways in which they described their pain, according to the McGill Pain Questionnaire (Short Form). There were no significant differences between imagers and non-imagers on any of the variables on this measure. On the pain line (where respondents indicate how severe their pain is) the imagers group scored a mean of 68.7 (*sd*=27.0, *N*=17) compared to the non-imagers who scored a mean of 71.1 (*sd*=21.1, *N*=58). An independent *t*-test revealed no difference between the groups (*t*=0.368, *df*=73, *p*=0.701, *d*=0.09).

On the McGill main score (pain words) there was again no difference between the two groups (imagers scoring a mean of 19.42 (sd=9.75, N=19) and those with no images scoring a mean of 14.81 (sd=8.73, N=64)). An independent t-test revealed no significant differences ($t=1.967$, $df=81$, $p=0.053$, $d=0.44$). However the scores are very close with only a difference of 4 points. This may mean that the imagers conceptualise their pain as slightly worse than the non-imagers do. However such a small difference might also be found due to chance.

Results Overview

An overview of the main mean differences findings is provided in Table 6.2 below.

Table 6.2 – Summary of mean differences between Imagers and Non-imagers

| | N imagers | Mean imagers | SD | N non-imagers | Mean non-imagers | SD | t | df | p | d |
|------------------|--------------|-----------------|-------|------------------|---------------------|-------|------|----|-------|------|
| HADS Anxiety | 19 | 12.89 | 5.39 | 64 | 8.02 | 4.29 | 4.09 | 81 | <.001 | 0.91 |
| HADS Depression | 19 | 11 | 6.06 | 64 | 7.56 | 3.92 | 2.93 | 81 | .004 | 0.65 |
| R+M SIP | 19 | 13.42 | 6.97 | 64 | 12.19 | 5.53 | 0.80 | 81 | .424 | 0.18 |
| Catastrophising | 19 | 27 | 12.31 | 62 | 19.9 | 8.72 | 2.80 | 79 | .006 | 0.63 |
| Coping | 19 | 20.68 | 9.70 | 62 | 23.95 | 7.90 | 1.49 | 79 | .139 | 0.34 |
| Resourcefulness | 18 | 23.94 | 6.57 | 63 | 25.03 | 7.84 | 0.54 | 79 | .593 | 0.12 |
| Helplessness | 18 | 15.39 | 8.40 | 63 | 13.35 | 6.27 | 1.12 | 79 | .264 | 0.25 |
| McGill Total | 19 | 19.42 | 9.75 | 64 | 14.81 | 8.73 | 1.97 | 81 | .053 | 0.44 |
| McGill pain line | 17 | 68.71 | 27.06 | 58 | 71.1 | 2.77 | 0.39 | 73 | .701 | 0.09 |
| AAQ | 19 | 38.32 | 9.86 | 62 | 8.723 | 1.11 | 1.69 | 79 | .094 | 0.38 |
| CPAQ | 19 | 48.53 | 25.61 | 64 | 56.66 | 21.46 | 1.39 | 81 | .169 | 0.31 |

(Key to measures presented in Table: HADS= Hospital Anxiety and Depression Scale,

R+M SIP=Roland Morris Sickness Impact Profile, AAQ=Acceptance and Action

Questionnaire, CPAQ=Chronic Pain Acceptance Questionnaire.)

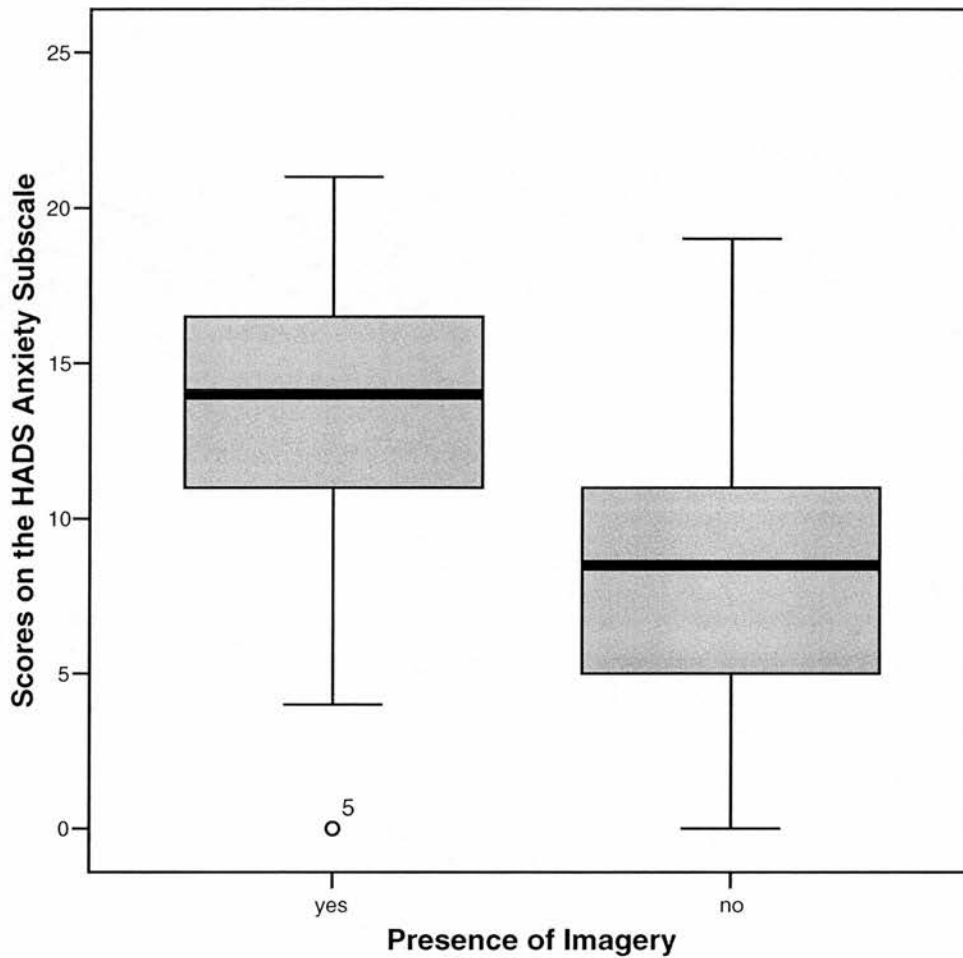
Each hypothesis will now be considered in turn.

Hypothesis 1

Chronic pain patients who report mental images of pain will report higher levels of anxiety.

In order to test this hypothesis, an independent t-test was conducted. The mean HADS anxiety score for those who reported mental images of their pain was 12.89 (sd=5.39, N=19) and for those who did not report mental images the mean score was 8.02 (sd=6.06, N=64). This result is statistically significant ($t=4.092$, $df=81$, $p<0.001$, $d=0.91$) suggesting that those who report mental images of their pain also report significantly higher levels of anxiety than those who do not report having images of their pain. These findings can be seen displayed in a box and whisker plot overleaf (Figure 6.1). Although there was one outlier within this subscale (someone who reported imagery also gave a HADS Anxiety score of 0) analyses were run with the outlier both included and excluded. This made little difference to the outcome and so it was decided to leave the data intact. There was no reason to believe that the outlier did not represent valid data.

Figure 6.1 – Box and Whisker plot of HADS Anxiety scores according to whether or not participants describe mental imagery of their pain.



It is clinically interesting to note that the two groups also vary in case-ness. The group who did not report mental images of their pain fall below the threshold required to meet clinically relevant levels of anxiety and the imagers group fall within this clinically relevant range of scores (i.e, above a score of 9). In order to examine if the numbers of people within each group who fell within case-ness was significant, Chi square analyses were conducted. 79% of the imagers (15 people) fell within case-ness and 50% of the non-imagers (32 people) also met the cut off score for case-ness (a score of 9 or above). Chi-Square analysis suggested that this difference was significant ($\chi^2=4.49$, $df=1$,

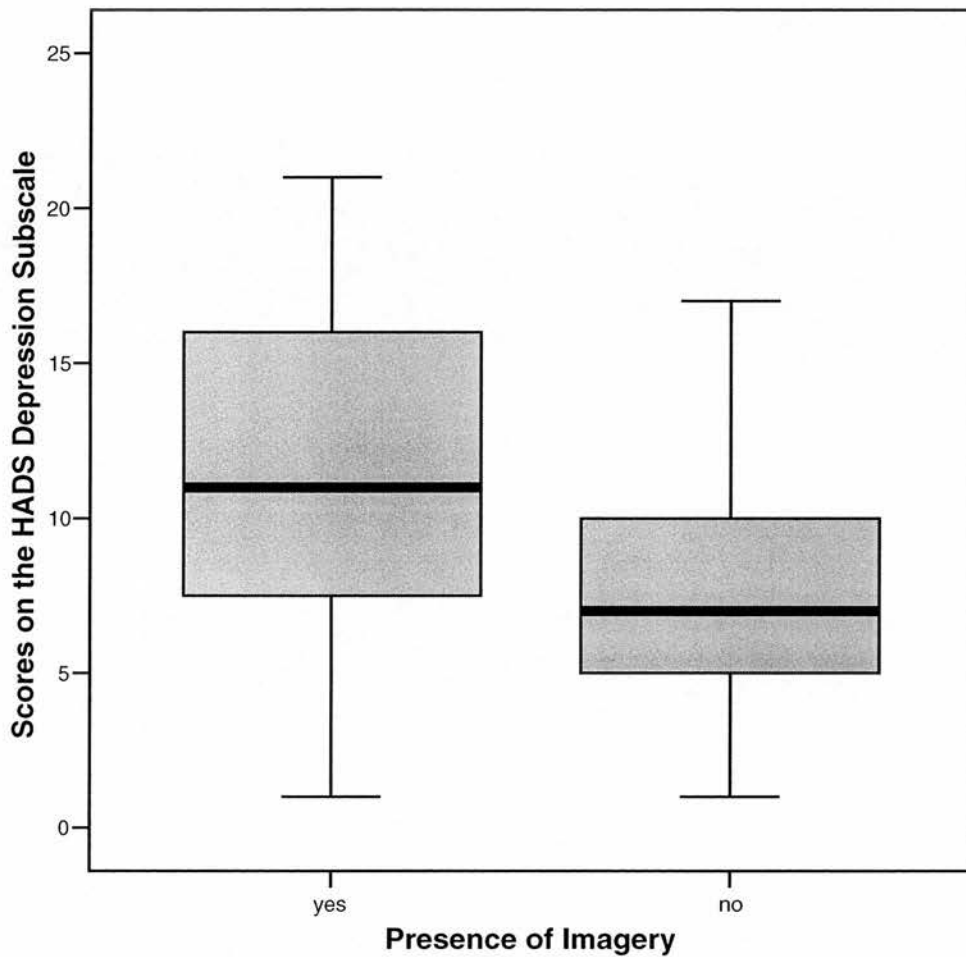
$p < 0.05$). So although people from both groups met the criteria for clinically relevant anxiety there were significantly higher levels of anxiety within the group who reported mental images of their pain. These data support the experimental hypothesis as those who experience imagery also report higher levels of anxiety on the HADS. That is to say that chronic pain patients who report mental images of their pain report higher levels of anxiety on the HADS.

Hypothesis 2

Chronic pain patients who report mental images of pain will report higher levels of depression.

The same grouping of those who have and those who do not have mental images of their pain was then used to look at the HADS depression subscale. The mean score for the group who did report mental images of their pain was 11.0 ($sd=6.06$, $N=19$) compared with the non-imaging group who had a mean score of 7.56 ($sd=3.91$, $N=64$). Independent t-tests were conducted using this variable ($t=2.933$, $df=81$, $p=0.004$, $d=0.65$). This result was statistically significant suggesting that those who report mental images of their pain report higher levels of depression than those who do not have mental images of their pain. These findings can be seen displayed in a box and whisker plot overleaf (Figure 6.2). The effect size ($d=0.65$) is a medium to large effect size according to Cohen's classification.

Figure 6.2 – Box and Whisker plot of HADS Depression scores according to whether or not participants describe mental imagery of their pain.



As can be seen in Figure 6.2 above, the effect found here is very strong. However, it is interesting to note that it is not as strong an effect as with the HADS Anxiety subscale. This will be discussed further in this paper. 63% of the imagers (12 people) fell within case-ness and 41% of the non-imagers (26 people) also met the cut off score for case-ness (a score of 9 or above). Chi-Square analysis suggested that this difference was not significant ($\chi^2=2.99$, $df=1$, $p>0.05$).

These data support the experimental hypothesis, as chronic pain patients who report mental images of their pain report higher levels of depression on the HADS.

Hypothesis 3

Chronic pain patients who report mental images of pain will have a lower level of physical functioning.

In order to test this hypothesis, an independent t-test was conducted. Again the grouping variable was the presence or absence of mental images of their pain, and scores on the Roland and Morris Sickness Impact Profile were compared. The mean of the two groups were almost the same at 13.42 (sd=6.97, N=19) for those who reported mental images and 12.19 (sd=5.53, N=64) for those who did not. An independent t-test ($t=0.803$, $df=81$, $p=0.424$, $d=0.18$) confirmed that this was not statistically significant.

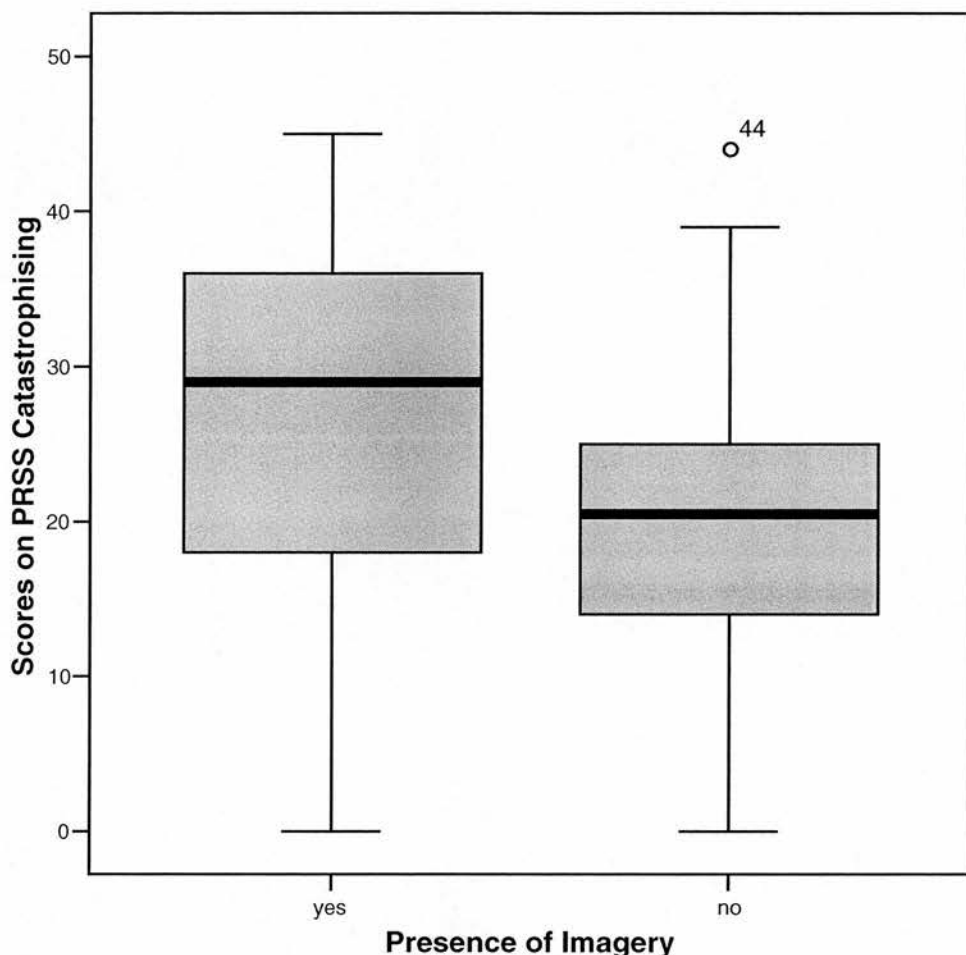
As there was no difference in physical functioning scores between the two groups it would seem that with this sample, chronic pain patients who report mental images of their pain have similar levels of physical functioning as those who do not report mental images of their pain.

Hypothesis 4

Chronic pain patients who report mental images of pain will report a range of maladaptive cognitions.

The subscales of the PRSS are Catastrophising and Coping and the subscales of the PRCs are Resourcefulness and Helplessness. On the PRSS catastrophising subscale the mean score for those reporting mental images of their pain was 27.0 (sd=12.30, N=19) and for those who did not report mental images of their pain the mean was 19.90 (sd=8.72, N=62). Independent t-tests were conducted ($t=2.803$, $df=79$, $p=0.006$, $d=0.63$) suggesting a statistically significant difference between the two groups. These results can be found displayed in a box and whisker plot overleaf (Figure 6.3). For this analysis, there was one outlier in the group who did not report mental images of their pain. They were not removed from the group however as analyses were run with the outlier both included and excluded and it did not significantly affect the outcome. Raw data was reviewed and there was no reason to suspect that it was not valid data.

Figure 6.3 – Box and Whisker plot of mean scores on the PRSS Catastrophising Subscale according to whether or not participants describe mental imagery of their pain.



The data suggests that those who report mental images of their pain have more catastrophic thoughts than those who do not report such images.

On the PRSS Coping subscale the mean for the group who reported mental imagery was 20.68 (sd=9.701, N=19) and for the non imagers was 23.95 (sd=7.902, N=62).

Independent t-tests ($t=-1.493$, $df=79$, $p=0.139$, $d=0.34$) indicated no statistical difference between the groups.

On the PRCS Resourcefulness subscale the mean score for those reporting mental images was 23.94 (sd=6.566, N=18) compared with the score of those not reporting mental images 25.03 (sd=7.845, N=63). Independent t-tests ($t=-0.536$, $df=79$, $p=0.593$, $d=0.12$) indicated no statistical difference between the two groups.

On the PRCS Helplessness subscale the mean for those reporting mental images was 15.39 (sd=8.403, N=18) whilst for those who did not report mental images the mean score was 13.35 (sd=6.274, N=63). Independent t-tests ($t=1.124$, $df=79$, $p=0.264$, $d=0.25$) indicated no statistical difference between the groups.

These data suggest that the cognitive styles of both those who do and do not report mental images of their pain are not significantly different in 3 of the 4 areas measured. The only significantly different result was in relation to catastrophising and this will be discussed further in Chapter Seven.

Hypothesis 5

There will be a stronger relationship between acceptance and distress than between catastrophising and distress.

In order to test this hypothesis psychological distress was taken as the total HADS score (anxiety and depression together). Based on their large scale (N=1792) normative data study, Crawford et al (2001) suggest that combining the two scores to create an overall

score of psychological distress is legitimate. Initially Pearsons correlations were conducted, the results of which can be seen in Table 6.3 below.

Table 6.3 – Correlation table for Catastrophising, CPAQ and HADS total scores

| Correlations | | | | |
|-----------------|---------------------|-----------|-----------------|-----------|
| | | CPAQ | Catastrophising | HADS |
| CPAQ | Pearson Correlation | 1 | -.492(**) | -.593(**) |
| | Sig. (2-tailed) | . | .001 | .001 |
| | N | 79 | 79 | 79 |
| Catastrophising | Pearson Correlation | -.492(**) | 1 | .681(**) |
| | Sig. (2-tailed) | .001 | . | .001 |
| | N | 79 | 79 | 79 |
| HADS | Pearson Correlation | -.593(**) | .681(**) | 1 |
| | Sig. (2-tailed) | .001 | .001 | . |
| | N | 79 | 79 | 79 |

** Correlation is significant at the 0.01 level (2-tailed).

Table 6.3 shows the correlations among HADS scores, catastrophising and acceptance (CPAQ). As can be seen, people who have high catastrophising scores tended to have higher HADS scores ($r=0.678$). Correlations were then compared using Meng et al’s (1992) formula ($Z=1.118$, $p=0.235$). Although one had a stronger relationship than the other, the Z test showed no significant difference. This will be discussed in Chapter Seven.

Because two measures of acceptance were used these analyses were then run again using the Acceptance and Action Questionnaire (AAQ). Psychological distress was again taken as the total HADS score (anxiety and depression scores summed together). Initially Pearsons correlations were conducted, the results of which can be seen in Table 6.4 below.

Table 6.4 - Correlation table for Catastrophising, AAQ and HADS total scores

Correlations

| | | Catastrophising | HADS | AAQ |
|-----------------|-----------------|-----------------|----------|----------|
| Catastrophising | Pearson | 1 | .681(**) | .628(**) |
| | Correlation | | | |
| | Sig. (2-tailed) | . | .001 | .001 |
| | N | 79 | 79 | 79 |
| HADS | Pearson | .681(**) | 1 | .714(**) |
| | Correlation | | | |
| | Sig. (2-tailed) | .001 | . | .001 |
| | N | 79 | 79 | 79 |
| AAQ | Pearson | .628(**) | .714(**) | 1 |
| | Correlation | | | |
| | Sig. (2-tailed) | .001 | .001 | . |
| | N | 79 | 79 | 79 |

** Correlation is significant at the 0.01 level (2-tailed).

As can be seen in Table 6.4 above both the AAQ and catastrophising correlate very highly with HADS total score.

Correlations were then compared using Meng et al's (1992) formula ($Z=-0.512$, $p=0.608$). Although one had a stronger relationship than the other, the Z test showed no significant difference. This will be discussed in Chapter Seven.

Chapter Seven: Discussion

The purpose of this study was two fold. Firstly to evaluate whether individuals who experience mental images related to their pain have poorer physical and psychological functioning than those who do not report such imagery. Secondly to examine whether cognitions (catastrophising) or acceptance can better explain the variance in emotional functioning in terms of HADS scores. The findings will now be discussed in terms of previous bodies of work and suggested future directions for research.

7.1 Discussion of results in relation to Hypotheses

Each of the hypotheses will now be addressed and discussed in turn.

Hypothesis 1

Chronic pain patients who report mental images of pain will report higher levels of anxiety.

The results of this hypothesis suggested that there were significant differences in reported anxiety between the group of people who have mental images of their pain and those who do not. It is postulated that in having these images of their pain, people ruminate about their pain, spending concentrated time and energy thinking about their pain. They therefore are more prone to becoming anxious about their pain and how this affects their life. The links between anxiety and catastrophising are well documented (e.g. Wells, 1997) and indeed the results of this study suggest that people who did have images of their pain also reported much higher levels of catastrophising than the non-imagers. However it could be conceptualised that the vulnerabilities that leads people to become anxious then also leads them to have these images of their pain. Within the present study no causality was examined and we therefore cannot draw conclusions about which may factor may be causing the other, if indeed there is causality at all.

The differences found between the two groups on the anxiety subscale was particularly significant suggesting there is a large difference in reported anxiety between people who do and do not report mental images of their pain. If we generalise this to the chronic

pain population at large then it would be reasonable to assume that results would be similar. A total of 22.9% of people reported images and of these people 79% also reported clinically relevant levels of anxiety. It would seem therefore that the prevalence of anxiety in the chronic pain population is likely to be larger than services are aware of and most people never come to the attention of support services. This is something that needs to be taken into consideration by all professionals working with people with chronic pain as more of their patients may be anxious than they are aware of.

Hypothesis 2

Chronic pain patients who report mental images of pain will report higher levels of depression.

As predicted results showed that chronic pain patients with mental images of their pain reported significantly higher levels of depression. In a similar vein to Hypothesis 1 it may be that the people who have mental images of their pain are ruminating more about their situation and therefore spending more time thinking about their pain and attempting to conceptualise their pain in as many different ways as possible. It could be postulated that either the depression came first and subsequently the images arose as a consequence of this. Alternatively it could be that the images were there from the start and these images led to the people becoming more depressed.

Madland, Feinmann and Newman (2000) found in their sample that depression and catastrophising were linked, as indeed as they appear to be in the present study. However, their sample only included facial pain patients but this finding has been found to generalise to the chronic pain population at large in this research. Although this was less significant than the number of people reporting clinically relevant anxiety, it is still something that needs to be considered by all professionals working with chronic pain patients. If the numbers of people with depressive symptoms due to their pain are larger than anticipated then it appears that a large number of people with these difficulties are never obtaining support that they may require. Within this sample, 43% of people reported clinically relevant levels of depression. This is a significantly higher number than reported by Breivik et al (2006) who found that 21% of people with chronic pain also reported clinically relevant levels of depression. Both the Breivik et al (2006) study and the present study suggest that depression is vastly under-reported within a chronic pain population.

Hypothesis 3

Chronic pain patients who report mental images of their pain will have a lower level of physical functioning.

The results of this hypothesis were not what were expected as it was found that there were no differences between the group who reported images of their pain and the group who did not. This may be due to the fact that the difference in the groups is more of a psychological one in terms of them either being imagers or non imagers. This has

clearly not translated into the physical disability that they report. This finding seems to suggest that even those who report higher scores of anxiety and depression are not more physically disabled than those who are less depressed and anxious. So it seems that for this sample being depressed and/or anxious does not make people more physically disabled. And conversely, being more physically disabled does not in itself seem to lead to people feeling more physically disabled. This is against the general wisdom that when people are more depressed and anxious they become less able to do the things that they used to, ruminate more and therefore become more physically disabled by their chronic pain. Reasons for this could be that the sample from which this research was undertaken are all attending the chronic pain service. Many of the patients at the service take medication to help with their chronic pain and this may have meant that they are less disabled by their pain than they perhaps would be without medication. It could also be that some of the patients who responded had been attending either the pain management group, physiotherapy, clinical psychology or some of the alternative therapies. This may have made a vast difference to how disabled they feel by their pain and therefore mean that there were no differences between the groups on this measure. Another explanation is that as the R+M SIP is a self report measure it is only really examining how disabled people feel by their pain and not how disabled they actually are. It is a subjective measure of disability caused by chronic pain.

Hypothesis 4

Chronic pain patients who report mental images of their pain will report a range of maladaptive cognitions.

Once the data set had been split into imagers and non imagers, four different aspects of cognitions were examined; Catastrophising, Coping, Resourcefulness and Helplessness. There were no differences reported between the imagers and non-imagers on the domains of coping, resourcefulness or helplessness. So despite reporting higher levels of depression and anxiety, it seems that the group who do have images of their pain do not differ on these domains. The reason for this is unclear but may be due to several factors. People who have images of their pain appear to be more depressed and more anxious but do not have a higher level of physical disability. For this sample it may be that their level of disability is something that mediates how they feel they can cope with their chronic pain and the associated difficulties this brings. It may also be that as both the imagers and the non imagers report almost the same level of pain that coping is more do to with perceived level of pain than it is to do with how depressed or anxious they may feel. This finding perhaps suggests that within a chronic pain population, thoughts about coping do not mediate how depressed or anxious a person may become about their current situation. However, it could also be that the sample had almost the same level of coping and that this is mediating how bad they perceive their pain is and how disabled they become by their pain.

This is a potentially interesting finding in terms of clinical practice. In terms of clinical practice, clinical psychologists spend much time examining the way people cope with difficult situations and helping them to adapt and strengthen their own coping strategies. However, within this sample, there was no difference reported in thoughts about coping.

Those who did and did not report mental images of their pain reported the same thoughts about their ability to cope.

There were no differences between the groups on either of the domains of resourcefulness and helplessness. This is particularly interesting as there is such a vast difference between the groups on scores of anxiety and depression. Despite this, both groups report being equally as resourceful and yet feeling equally as helpless as one other. This would appear to contradict what common convention might dictate. People who feel depressed and anxious and are high catastrophisers would seem more likely to report low levels of resourcefulness and high levels of helplessness. This finding perhaps points to the need for clinical psychologists to start to work more within catastrophising and less within the domains of coping, resourcefulness and helplessness.

Vast differences were reported between the imagers and the non-imagers on the domain of catastrophising. This is congruent with the findings of differences in depression and anxiety. Both of these problems are associated with a high catastrophising cognitive style so it seems clear that they sit well together. Catastrophising boosts anxiety and worry which stimulates neural systems that produce increased sensitivity to pain (Grau and Meagher, 1999). However, what is still unclear is which the primary or underlying factor is. Much more research needs to go into investigating the links between the different sets of cognitions in order that we can better understand the styles that are likely to lead to the most emotional difficulties. Only when this is more obvious will it be possible to differentiate what cognitive processes are happening and begin to create more effective strategies to work on these maladaptive cognitions.

Hypothesis 5

There will be a stronger relationship between acceptance and distress than between catastrophising and distress.

The findings of the correlated correlations analyses suggest that acceptance explains less of the variance in total HADS scores than catastrophising does, however this difference is not significant. At present the ACT approach to chronic pain is gaining credence and support from the literature. Interventions aimed at targeting catastrophising thoughts (such as CBT) may be more effective than those targeting acceptance (such as ACT). However, these findings suggest that much further research is needed in order to draw firm conclusions about whether acceptance or catastrophising helps us to understand more about the mechanisms leading to anxiety and low mood in chronic pain patients.

This is in direct contradiction to the studies by McCracken and Eccleston (McCracken & Eccleston, 2003, 2006) which found that acceptance exerts a greater influence on adjustment (measured by levels of reported anxiety, depression and disability) than coping and pain-related cognitions do. These two studies were very similar, the later being a reproduction of the former to account for difficulties with the factor structure of one of the measures used. These findings would appear therefore to be robust findings about acceptance. It is unclear why there are such differences reported between these findings and the findings of the present study. Reasons for this might be due to random sample differences or to the measures used. The CPAQ was used in both studies, but the McCracken and Eccleston (2003, 2006) studies utilised the Coping Strategies

Questionnaire Revised (CSQ, Riley and Robinson, 1997). Within the present study cognitions were measured using the Pain Related Self Statement Scale (PRSS, Flor et al, 1993) for catastrophising and coping and the Pain Related Control Scale (PRCS, Flor et al, 1993) to examine resourcefulness and helplessness. There may be something inherently different about these three measures and the ways in which they pick up on thoughts about ability to cope. Further research would be useful to aid our understanding of these scales and in what ways they may differ in the data they collect.

7.2 Clinical Implications of results

This research has provided much interesting material in terms of the direction it may suggest for clinical work with chronic pain patients. Although it was hypothesised that there may be a difference in functioning between those who do and those who do not report mental images of their pain, it was unexpected to find such a large difference in anxiety and depression. Levels of both anxiety and depression were much higher amongst those who reported experiencing images of their pain. Anxiety in particular was significantly higher amongst those who reported experiencing mental images of their pain. However, those people who reported images of their pain did not report worse levels of pain or greater levels of physical disability than those without such images.

In terms of working clinically with sufferers of chronic pain, the findings of this research suggest some changes to clinical practice. It appears that people who report mental images of their pain also report much higher levels of depression and anxiety.

This is despite their reported pain and associated disability being no worse. Therefore it seems that to ask about the presence of mental imagery of pain is something that should be done within the clinical interview. When assessing patients with chronic pain, questions about mental imagery of their pain are not routine. The present research suggests that it should be part of a routine assessment of a chronic pain patient to ask about images and then work with them if they are present. As suggested here, presence of mental imagery would be a strong indicator as to the presence of anxiety and depression.

After a detailed assessment of a patient's mental images of their pain, there is much work that might be done in terms of helping the patient to understand and perhaps manipulate this distressing mental image. Within the service in which this research was undertaken, relaxation and visual manipulation of a patient's pain is something that is routinely used. However, more work needs to be done to look at the specific mechanisms mediating between the images that people report and the effects that this has on their understanding of their pain and their response to it, as well as the effects these interventions have on emotional functioning. Single case experimental designs may be a useful technology to investigate differences between verbal reattribution and/or cognitive techniques on cognitive contents such as catastrophisation and imagery manipulation processes on mental imagery, to see which of these works best for whom in reducing emotional distress.

The Pain Clinic within which the current work was undertaken utilises imagery based work primarily within a relaxation format. Chronic pain patients who are highly

anxious can benefit significantly from relaxation training (Main & Spanswick, 2000). Within many of these interventions, imagery is used in two primary ways – either pain focused or used as distraction. Within a distraction framework patients are taken to a deep state of relaxation and then mental images are provided that help the patient remove themselves from their pain and focus on something that they find pleasant. In a pain focused intervention, patients are encouraged to visualise their pain and attempt to change what it looks and feels like. They are directed to think about what their pain looks like – its texture, shape, colour and to try to make it less threatening. Primarily this helps them to realise that they have some control of their pain and that they can have an influence over their pain and the effect that this has on them. The present work implies that a more pain focused approach may be a useful tool to help patients feel more in control of their pain. If images are important in terms of feelings about pain then perhaps changing them would produce a positive effect both on functioning and well being.

It is perhaps understandable that anxiety is linked with chronic pain as many people develop fear of movement and restrict their movements in order to control their pain levels. Whilst this creates less pain for them in the short term, in the longer term they become more disabled by their pain and less able to take part in activities of daily living. The psychological effects of this are low mood, anhedonia and bleak outlook for the future. At present, pain clinics do not routinely assess for imagery of pain, but if higher anxiety and depression are a consequence of having mental images of pain then it points to the need for clinicians to become more interested in imagery and to routinely

ask their patients about the presence of any such imagery of pain. In addition, research efforts to better measure imagery would be well warranted.

On the McGill Pain Line, there were no differences between the imagers and the non imagers. However, on the McGill main score (pain words) there was only an average of 4 points difference between the groups (although this was not significant). This finding is particularly interesting as it suggests that although the imagers are not describing worse pain in absolute terms, they are using more descriptors to explain their pain. It might be the case that they are trying to communicate more distress about their pain and that the pain words gives them this opportunity.

Although partial correlations make possible the mathematical isolation of variables that cannot be isolated experimentally, there are issues with kind of design. It does not allow for causality to be examined and only examines whether the variables have a relationship with the outcome variable once another variable has been examined.

However, the present research does suggest that both catastrophising and acceptance are important variables in chronic pain and that both need to be thoroughly examined. The present research suggests that clinical assessment of both these variables is well warranted and specific questions and assessment tools should be used to examine both these constructs as part of routine psychological assessment of chronic pain patients.

7.3 Theoretical implications of results

Although there are many clinical implications of the research, there are also theoretical implications suggested by the findings. The current findings lend themselves to two main interpretations of the relationship between imaging and HADS scores. Perhaps those people who are imagers have something fundamentally different about the way in which they conceptualise their pain. It may be a basic difference in the way in which people understand their situation – perhaps they have these images and these are producing high scores on the HADS. A second interpretation of the results may be that the people who reported images may have been low in mood and this caused them to ruminate more and then produce these images. Depression tends to cause people to withdraw from activities and spend longer ruminating on their current predicament. Lengths of time spent thinking about their pain due to their low mood may then have produced these spontaneous images. At this stage it is not clear which may have come first. Future research would need to concentrate on this relationship to attempt to examine the underlying processes and mechanisms. If more was known about this relationship and whether imagery is mediating anxiety and depression or they are mediating imagery then further studies could concentrate their efforts accordingly.

The results of this study could be interpreted as suggesting that imagery may just be a modality of communication for the patients who reported having images of their pain. Asking a person to describe their pain can be very complex task as pain is such a difficult concept both to describe and understand.

The science of psychological therapy for chronic pain would also benefit from further investigation into whether images come first and that causes the low mood and anxiety problems or whether these difficulties in themselves then cause people to ruminate more and then come up with the images. Having a better idea about which variable precedes the other would enable clinical psychologists to create more meaningful formulations and interventions for patients. Assessments may also be changed slightly to include questions about the presence or absence of imagery. At present it is unclear about whether presence of imagery may be a state and therefore fairly stable to the person or a trait that may emerge when the presence of chronic pain causes difficulties for the person in their life.

The findings of the partial correlations suggest that using two measures of acceptance may be more useful than using one measure alone. Most research studies use only one measure and as has been shown here, this can be misleading. The AAQ is a generic measure of experiential avoidance and whether people feel they have the ability to do things in the presence of difficult psychological events. The CPAQ is a pain-specific measure of acceptance, and looks more at the functional and behavioural aspects of acceptance. Although the AAQ and the CPAQ measure slightly different aspects of acceptance they are still both measures of acceptance and because of this, the majority of research only utilises only one measure of this construct. The findings of the present research suggests that to rely on one measure of acceptance may be unwise and that contemplating another measure of acceptance in future studies would be well warranted.

7.4 Limitations of Findings

As with all psychological research with human participants there are some factors that may limit the findings. The battery of nine measures sent to participants was very large and took approximately 45 minutes to complete. The sheer size of the battery may have put some people off answering. Perhaps a smaller battery size may have meant a higher response rate. All the measures were felt necessary as they examine different aspects of functioning for people with chronic pain. Utilising such a large battery of measures has both benefits and drawbacks in terms of a postal questionnaire design such as this one. All measures utilised within the study were self report measures. This assessment method allows a number of factors to contribute to the patients' responses to the questionnaires. Self report measures are also subjective and only refer to peoples' perceptions of how things are. This may be different to what would emerge from clinical interview. Despite this difficulty it is consistent with the concept of pain, which is also subjective in its nature and experience and has no specific measurement tool to assess it other than self-report.

This study may have suffered from a non-responder bias. A total of 350 questionnaires were sent out and only 83 were returned (23%). This means that 77% of people who received the questionnaires did not respond. So although the sample size was still large, there were many more people who were not included as they did not elect to be involved and therefore it is difficult for the implications of the research to be viewed as an accurate picture of chronic pain populations. However, a study undertaken in Finland by Kotaniemi, Hassi, Kataja et al (2001) found that those who did not respond to their postal questionnaire research were less likely than the original sample to have

the symptoms that were being enquired about. The authors were looking at respiratory problems and those who did not respond originally were found to be largely men and on the whole had many less symptoms of respiratory difficulties than those who did respond initially. However, these results may not generalise to the present study as the Finnish study (Kotaniemi, Hassi, Kataja et al, 2001) investigated respiratory problems only. The methodology used within the present study would have been likely to be more interesting to everyone who attends the pain clinic as everyone who was mailed the questionnaire pack was attending the chronic pain clinic for issues concerning their pain.

Within the present study, nothing was done to control for the emotions associated with a person's image of their pain. As can be seen in Table 5.1 the images that people reported vary from almost neutral ("a dark cloud") to very distressing ("as though I am being burned alive"). At present it is unknown how the differences in images reported may affect the functioning of the person associated with the image. A detailed examination of these differences and what impact they may have had on functioning would be well warranted but is outwith the realms of the current work.

It should also be noted that no control was made for the use of medication by the participants. The vast majority of the patients within the pain clinic take analgesic medication and a proportion also take psychiatric medication, primarily anti-depressant medication. The use of these pharmaceuticals may have had an influence on the severity of pain that was reported and on the levels of anxiety and depression reported. It may also have affected the disability levels that were reported by the participants.

Those taking prescription analgesics may have found that their pain levels were reduced by the medication and therefore report reduced levels of pain and associated disability. As depression and anxiety were of particular interest it would have been advantageous to have asked about psychiatric medication. Future studies would benefit from asking about prescription medication and perhaps controlling for their use within the sample.

In the demographics information sheet, participants were asked the question “Have you ever suffered from a serious mental health problem? If so, please detail below”. The wording of this question in itself may have caused a bias in the results as many lay people associate the term “mental health problem” with psychosis and schizophrenia and not with the more prevalent mental health issues such as depression and anxiety and the vast majority of the general public have very poor mental health literacy (Jorm, 2000). This may have meant that there was an under-reporting of the prevalence of mental health problems within this sample. However, from the range of responses received it would seem that most people understood what was being asked of them as it was primarily depression that was outlined. 18 people responded that they had suffered from a serious mental health problem and of these 15 were in relation to depression. Therefore it would seem that within the present sample described the issue of people not understanding the question did not affect those who did respond, but may have led to underreporting of mental health difficulties.

No questions specifically asked about the site where the chronic pain was experienced. It was felt that to do this would be to add in yet another layer of analyses and would be unlikely to yield particularly interesting results within the present sample size.

However there might be differences in the ways in which people respond to their pain depending on the site of their pain. For example, Western cultures are familiar with back pain and how debilitating this can be for sufferers. However other conditions such as fibromyalgia are less well known and this may affect the way in which people with this condition conceptualise themselves and the ways in which others think about them and their condition. The context in which someone experiences their pain cannot be overstated. Perhaps future research might narrow chronic pain into smaller categories in order to gain specific knowledge about individual diagnosable diseases and disorders.

7.5 Strengths of the study

One of the particular strengths of this study is the relatively large sample size. Having sampled a total of 83 respondents means that it is possible to draw inferences from the data set and apply them to real world settings with some degree of confidence. The particular population from which the sample was drawn covers a large geographical area covering both urban and rural areas and is therefore considered to be likely to be representative of the general UK population.

The sample was not just patients attending the clinical psychology service, but patients attending any part of the chronic pain service. It is notable that such large numbers of chronic pain patients met clinical criteria for anxiety and depression despite not coming to the attention of the clinical psychology service. The results indicate that chronic pain is associated with a high risk of anxiety and depression and more maladaptive cognitive styles such as catastrophising.

The age range within this study was large (from 29 to 88 years of age) giving a representative spread across the lifespan. Chronic pain has been found to be more prevalent in older age and the spread of ages within the present study reflects this with a large percentage over the age of 65. The sample here would appear to be representative of chronic pain patients in general.

This study has looked at the concepts of both acceptance and catastrophising and how these affect variance with each other and with outcome and this is something that is rarely done within the literature. Researchers have tended to stay away from a direct comparison of one over the other and stayed with looking at a single factor and how it goes about explaining some of the variance in chronic pain. A strength of this study is the fact that it has taken the two variables and compared the variance that they have with depression and anxiety in order to help us to understand more about the psychological mechanisms at work in chronic pain.

7.6 Suggestions for Future Research

This study offers a preliminary exploration of imagery and its role within chronic pain. Much more research needs to be undertaken to understand more about imagery and the psychological mechanisms at play within chronic pain. The creation of a standardised measure of imagery within chronic pain would greatly benefit future research efforts. Such a measure would mean that future researchers would have access to a reliable tool to measure what imagery, if any, their patients report. As already discussed, the present study utilised nothing more sophisticated than the question “Some people describe

mental images of their pain, do you have an image of your pain?" If a standardised measure could be created then it would mean that future researchers would be able to examine the concepts involved in imagery with more confidence. More accurate figures about the prevalence of imagery and the strength of the relationships it has with the other facets of functioning would then be possible.

It would also be useful to know more about the content of the images that people describe in relation to their pain. The present study only asked about the presence of imagery and did not question further how long such images might last and if there are any emotions attached to such imagery. Knowledge such as this would aid our understandings of imagery in chronic pain and what impact this may have on functioning and distress for these patients. Information about how long the images last, how often they occur and whether they are affected by variables outside the person, such as stress or pain flare ups would be useful to aid our understanding of imagery. As mentioned previously such a project might benefit more from a qualitative study to really begin to understand the individual differences in imagery that the present study suggests is present.

The recent onset of medical imaging tools may mean that future researchers might be able to look at brain differences in those who do and do not describe mental images. This might mean that the profession would have access to look at exactly what is happening in the brain on a neural level. This would be fascinating data and provide many interesting ideas about imaging ability and its relationship with functioning for patients with chronic pain. If we were able to see more of the parts of the brain that are

utilised during imaging then we might be able to understand more about the way the pain mechanism works and in what way, if any, imagery is connected to these mechanisms. Neuro-imaging could provide corroboration of imagery processes and would give further level of depth to the idea that mental imagery is associated with different cognitive processes, over and above self report measures.

It was anticipated that the imagery people reported would be similar and fall easily into categories. As can be seen in Table 6.1 this was not the case. Reported mental images of pain varied vastly across participants. There were very few that could be thought of as being in any way similar. It would appear from the present research that imagery is a very personal thing and that to attempt to categorise people's responses would be to lose a lot of the richness of the data. A quantitative approach to imagery seems to have meant that a lot of people reported that they did not have images of their pain. It would seem likely that although those who do have strong images reported them, a number of people may not have understood the question or been unsure exactly what they were being asked. The development of a standardised measure to look at imagery would be something that would be extremely useful for future research projects. Whilst this would be complex, perhaps a qualitative study would unearth more about the intricacies of the images people with chronic pain are reporting. Perhaps a detailed qualitative study would act as a precursor in developing a more quantitative way of assessing or measuring imagery. The results described here would certainly warrant this as a useful tool for both future study and clinical work.

Only 19 respondents replied that they have mental images of their pain. Perhaps if more responses with imagery had been collected then categories of imagery would have emerged. At this point, it would seem that either the current question was not sensitive enough to pick up on all the different types of imagery that people may have or that only approximately 20% of chronic pain patients actually experience these images. It is difficult to discern which of these two factors was at play, but perhaps further research on how best to attain information regarding mental imagery of pain may reveal a more detailed picture.

Although much work has already been done looking at both ACT and CBT, this study suggests that there is still much work to be done. Randomised control trials have generally concentrated at looking at one therapy versus waiting list control. Very little work has been done looking at whether ACT or CBT is more effective within this population. Lambert (1992) suggested that model or technique factors account for about 15% of outcome variance. However this was an extensive, but non-statistical analysis of outcome research. More recently, Wampold (2001) suggested that 8% of the variance in outcome can be portioned to the specific model or therapy effects. This has to be considered alongside the finding that approximately 7% of the variance in therapy outcome can be attributed to therapist client relationship, suggesting that the specific model used is not as important as most clinicians like to believe. However the present work suggests that future research would be well placed to begin to tease apart the conceptual differences in the therapies and begin to understand how they are both working with this client group to bring about change. Perhaps if more was known about the variances in outcome for these therapies then more conclusive findings may be

possible in the future. Such dismantling studies are difficult and therefore experimentally based analogues of focusing on disputing content may be a useful precursor to large scale randomised control trials.

7.7 Conclusions

The present study describes a quantitative analysis of the differences that chronic pain patients report on various different levels of functioning according to whether or not they describe mental images of their pain. Results indicate that for those who describe having mental images of their pain there are higher levels of reported depression, anxiety and catastrophising.

Clinical psychologists working with chronic pain patients need to become more adept at assessing whether patients report mental images of their pain and start to formulate these images in any understanding of a patient's difficulties. At present imagery is largely ignored in clinical work but this study points to the need for imagery to be routinely asked about as part of any thorough assessment. This research suggests that there is much work to be done in the future looking at imagery and perhaps finding a better way of measuring images and the ways in which people experience them.

The present findings also suggest that there is much we still do not know about the underlying psychological processes happening within both Cognitive Behavioural Therapy and within Acceptance and Commitment Therapy. Whilst both of these therapies have a solid literature base to support their use within chronic pain, there is

clearly a lot we still do not understand about what processes need to be concentrated upon in therapy in order to bring about the most positive changes and the alleviation of suffering for our patients.

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Appendix I

Letter of Ethical Approval

Full title of study: An examination of chronic pain patients experiences of mental imagery and how this links with the constructs of emotional function, acceptance, behaviour and experience of pain.

REC reference number: 06/S1104/47

Thank you for your letter of 01 December 2006 (received 5 December), responding to the Committee's request for further information on the above research and submitting revised documentation.

The further information was considered at the meeting of the Sub-Committee of the REC held on 20 December 2006.

Confirmation of ethical opinion

On behalf of the Committee, I am pleased to confirm a favourable ethical opinion for the above research on the basis described in the application form, protocol and supporting documentation as revised.

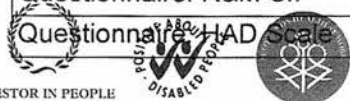
Conditions of approval

The favourable opinion is given provided that you comply with the conditions set out in the attached document. You are advised to study the conditions carefully.

Approved documents

The final list of documents reviewed and approved by the Committee is as follows:

| <i>Document</i> | <i>Version</i> | <i>Date</i> |
|------------------------|----------------|------------------|
| Application | | 01 November 2006 |
| Investigator CV | | 01 November 2006 |
| Protocol | 1 | 01 November 2006 |
| Covering Letter | | 01 November 2006 |
| Letter from Sponsor | | 20 October 2006 |
| Questionnaire: R&M SIP | revised | |
| Questionnaire: HAD | revised | |



| | | |
|---|---------|------------------|
| Questionnaire: AAQ | revised | |
| Questionnaire: CPAQ | revised | |
| Questionnaire: PASS | revised | |
| Letter of invitation to participant | 1 | 01 November 2006 |
| Participant Information Sheet: PIS | v2 | 27 November 2006 |
| Response to Request for Further Information | | 01 December 2006 |
| Details of Insurance | | 28 July 2006 |
| Summary of Research | 1 | 01 November 2006 |
| Demographics Sheet | 1 | 01 November 2006 |

Research governance approval

The study should not commence at any NHS site until the local Principal Investigator has obtained final research governance approval from the R&D Department for the relevant NHS care organisation.

Statement of compliance

The Committee is constituted in accordance with the Governance Arrangements for Research Ethics Committees (July 2001) and complies fully with the Standard Operating Procedures for Research Ethics Committees in the UK.

06/S1104/47**Please quote this number on all correspondence**

With the Committee's best wishes for the success of this project

Yours sincerely

Appendix II

Letter of Research and Development Approval

Dear Miss Potter

| | |
|----------------------|---|
| MREC No: | N/A |
| CRF No: | N/A |
| LREC No: | 06/S1104/47 |
| R&D ID No: | 2007/W/PSY/01 |
| Title of Research | An examination of chronic pain patients experiences of mental imagery and how this links with the constructs of emotional function, acceptance, behaviour and experience of pain. |
| Protocol No/Acronym: | N/A |

The above project has undergone an assessment of risk to and review of resource and financial implications. I am satisfied that all the necessary arrangements have been set in place and that all Departments contributing to the project have been informed.

I note that this is a single centre study sponsored by

On behalf of am happy to grant management approval from to allow the project to commence, subject to the approval of the appropriate Research Ethics Committee(s) having also been obtained. You should note that any substantial amendments must be notified to the relevant Research Ethics Committee and to R&D Management with approval being granted from both before the amendments are made.

Please note that under provides indemnity for negligence for clinical staff for research associated with their clinical duties. It is not empowered to provide non-negligent indemnity cover for patients. does not provide indemnity against negligence for healthy volunteer studies. This is the personal responsibility of both and is usually arranged with a medical defence organisation or through

This letter of approval is your assurance that is satisfied with your study. As Chief Investigator or local Principal Investigator, you should be fully committed to your

responsibilities within the Research Governance Framework for Health and Community
Research, an extract of which is attached to this letter.

Yours sincerely

Y Director

Research Governance Certificate
NRR authorisation
Tissue Policy (if applicable)
MTA (if applicable)

- ☒ (to be signed and returned)
- ☒ (to be signed and returned)
- ☐
- ☐ (to be signed and returned by the recipient)

ies

Appendix III

Questionnaire packs as sent to participants

Dear Patient,

Invitation to participate in research

As a patient who attends the , we would like to invite you to participate in some research that is being conducted within the department. The research is interested in finding out if there is a link between mental images and the ways in which people cope with chronic pain and aims to increase our understanding of possible links. This has implications for the way in which clinical psychologists might carry out therapy with people with chronic pain.

Enclosed is an information sheet and a pack of questionnaires. If you agree to take part in this research then please complete the questionnaires and return them in the stamped addressed envelope enclosed. It should take you approximately twenty minutes to complete.

If you can spare the time to complete these questionnaires it would be very much appreciated. Your participation in research is completely voluntary and will have no bearing whatsoever on the service you receive from tl

If you have any questions at all about the research then please do not hesitate to contact the chief investigate

With many thanks for your help.

Yours sincerely,

Participant Information Sheet

Investigation of the link between imagery and chronic pain

We would like to invite you to help our understanding of chronic pain by taking part in a research study. Before you decide it is important for you to understand why the research is being done and what it will involve. Please take time to read the following information carefully and discuss it with others if you wish. Ask us if there is anything that is not clear or if you would like more information. Take time to decide whether or not you wish to take part.

What is the purpose of the study?

This study aims to investigate the link between the reporting of mental images of pain and the way in which people cope in their lives.

Why have I been chosen?

You have been chosen as you have a diagnosis of Chronic Pain and have been attending the
Approximately 80 other people will also be taking part.

Do I have to take part?

No. It is up to you to decide whether or not to take part. You are free to withdraw from the research at any time and without giving a reason. Your decisions about this will not affect the standard of care you will receive.

What will happen to me if I agree to take part?

You will be asked to spend approximately forty five minutes to one hour completing some questionnaires that ask about your thoughts and feelings about your pain and about how you manage your pain. Please then return these in the postage paid envelope provided.

Will my taking part in the project be kept confidential?

All information which is collected about you during this research will be kept strictly confidential. There will be no identifying information on the questionnaire.

Who has reviewed the study?

This study was given a favourable ethical opinion for conduct in the NHS by the
Ethics Committee. It has also been approved by the

What will happen to the results of the research study?

The results of this study will be written up in part fulfilment of the degree of doctorate of Clinical Psychology at t . Participants wishing to see the results are welcome to contact the researcher for a full copy of the report. This will be available in . Participants are also welcome to telephone the department and discuss the results with the chief investigator at any time throughout the duration of the study.

Contact for further information

Thank you very much for your help.

Demographics Sheet

How old are you? _____

Are you male or Female? _____

What is the first part of your postcode? (e.g. EH4) _____

How long have you suffered from Chronic Pain? _____

Sometimes, people with chronic pain describe it as being “like” something else. Is your pain like something else?

What is your previous/current occupation?

Have you ever suffered from a serious mental health problem? If so, please detail below.

Thank you for your help.

CPAQ

Directions: below you will find a list of statements. Please rate the truth of each statement as it applies to you. Use the following rating scale to make your choices. For instance, if you believe a statement is 'Always True,' you would write a 6 in the blank next to that statement.

| 0 | 1 | 2 | 3 | 4 | 5 | 6 |
|---------------|---------------------|----------------|-------------------|------------|--------------------------|----------------|
| Never true | Very rarely true | Seldom true | Sometimes true | Often true | Almost always true | Always true |

- | | | |
|----|--|--|
| 1 | I am getting on with the business of living no matter what my level of pain is | |
| 2 | My life is going well, even though I have chronic pain | |
| 3 | It's OK to experience pain | |
| 4 | I would gladly sacrifice important things in my life to control this pain better | |
| 5 | It's not necessary for me to control my pain in order to handle my life well | |
| 6 | Although things have changed, I am living a normal life despite my chronic pain | |
| 7 | I need to concentrate on getting rid of my pain | |
| 8 | There are many activities that I do when I feel pain | |
| 9 | I lead a full life even though I have chronic pain | |
| 10 | Controlling pain is less important than any other goals in my life | |
| 11 | My thoughts and feelings about pain must change before I can take important steps in my life | |
| 12 | Despite the pain, I am now sticking to a certain course in my life | |
| 13 | Keeping my pain level under control takes first priority whenever I'm doing something | |
| 14 | Before I can make any serious plans, I have to get some control over my pain | |
| 15 | When my pain increases, I can still take care of my responsibilities | |
| 16 | I will have better control over my life if I can control my negative thoughts about pain | |
| 17 | I avoid putting myself in situations where my pain might increase | |
| 18 | My worries and fears about what pain will do to me are true | |
| 19 | It's a relief to realise that I don't have to change my pain to get on with my life | |
| 20 | I have to struggle to do things when I have pain | |

Activities Engagement

Pain willingness

Total

AAQ

Below you will find a list of statements. Please rate the truth of each statement as it applies to you. Use the following scale to make your choice.

| | | | | | | |
|--------|-------------|--------|-----------|------------|---------------|--------|
| 1----- | 2----- | 3----- | 4----- | 5----- | 6----- | 7----- |
| never | very seldom | seldom | sometimes | frequently | almost always | always |
| true | true | true | true | true | true | true |

_____ 1. I am able to take action on a problem even if I am uncertain what is the right thing to do.

_____ 2. I often catch myself daydreaming about things I've done and what I would do differently next time.

_____ 3. When I feel depressed or anxious, I am unable to take care of my responsibilities.

_____ 4. I rarely worry about getting my anxieties, my worries, and feelings under control.

_____ 5. I'm not afraid of my feelings.

_____ 6. When I evaluate something negatively, I usually recognise that this is just a reaction, not an objective fact.

_____ 7. When I compare myself to other people, it seems that most of them are handling their lives better than I do.

_____ 8. Anxiety is bad.

_____ 9. If I could magically remove all the painful experiences in my life, I would do so.

HAD Scale

Read each item and place a firm tick in the box opposite the reply which comes closest to how you have been feeling in the past week. Don't take too long over your replies: your immediate reaction to each item will probably be more accurate than a long thought out response.

Tick only one box in each section

I feel tense or 'wound up':

Most of the time
A lot of the time
Time to time, Occasionally
Not at all

| | |
|--|--|
| | |
| | |
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| | |

I feel as if I am slowed down:

Nearly all the time
Very often
Sometimes
Not at all

| | |
|--|--|
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| | |

I still enjoy the things I used to enjoy:

Definitely as much
Not quite so much
Only a little
Hardly at all

| | |
|--|--|
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| | |

I get a sort of frightened feeling like 'butterflies' in the stomach:

Not at all
Occasionally
Quite often
Very often

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| | |

I get a sort of frightened feeling as if something awful is about to happen:

Very definitely and quite badly
Yes, but not too badly
A little, but it doesn't worry me
Not at all

| | |
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| | |

I have lost interest in my appearance:

Definitely
I don't take so much care as I should
I may not take quite as much care
I take just as much care as ever

| | |
|--|--|
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I can laugh and see the funny side of things:

As much as I always could
Not quite so much now
Definitely not so much now
Not at all

| | |
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I feel restless as if I have to be on the move:

Very much indeed
Quite a lot
Not very much
Not at all

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Worrying thoughts go through my mind:

A great deal of the time
A lot of the time
From time to time but not too often
Only occasionally

| | |
|--|--|
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| | |

I look forward with enjoyment to things:

As much as ever I did
Rather less than I used to
Definitely less than I used to
Hardly at all

| | |
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I feel cheerful:

Not at all
Not often
Sometimes
Most of the time

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I get sudden feelings of panic:

Very often indeed
Quite often
Not very often
Not at all

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I can sit at ease and feel relaxed:

Definitely
Usually
Not often
Not at all

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I can enjoy a good book or radio or TV programme:

Often
Sometimes
Not often
Very seldom

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| | |

Do not write below this line

R&M SIP

When you are in pain you may find it difficult to do some of the things you normally do.

This list contains some sentences that people have used to describe themselves when they are in pain. When you read them you may find that some stand out because they describe you over the past few days including today. As you read the list, think of yourself. When you read a sentence that describes you put a tick against it. If the sentence does not describe you then leave the space blank and move onto the next one. Remember only to tick the sentence if you are sure that it describes how you have been recently.

1. I stay at home most of the time because of my pain.
2. I change position frequently to try and get comfortable.
3. I walk more slowly than usual because of my pain.
4. Because of my pain I am not doing any of the jobs that I usually do around the house.
5. Because of my pain I use a handrail to get upstairs.
6. Because of my pain I lie down to rest more often.
7. Because of my pain I have to hold on to something to get out of an easy chair.
8. Because of my pain I try to get other people to do things for me.
9. I get dressed more slowly than usual because of my pain.
10. I only stand up for short periods of time because of my pain.
11. Because of my pain I try not to bend or kneel down.
12. I find it difficult to get out of a chair because of my pain.
13. I find it difficult to turn over in bed because of my pain.
14. My appetite is not very good because of my pain.
15. I have trouble putting on my socks (stockings / tights) because of my pain.
16. I only walk short distances because of my pain.
17. I sleep less well because of my pain.
18. Because of my pain I get dressed with help from someone else.
19. I sit down for most of the day because of my pain.
20. I avoid heavy jobs around the house because of my pain.
21. Because of my pain I am more irritable and bad tempered with people than usual.
22. Because of my pain I go upstairs more slowly than usual.
23. I stay in bed most of the time because of my pain.
24. I am in pain almost all of the time.

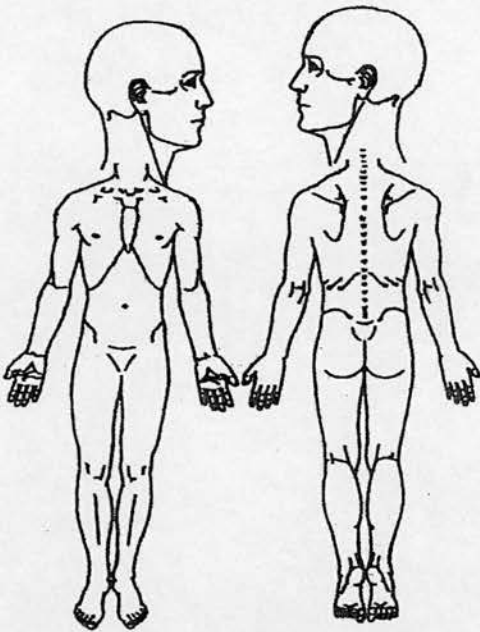
Appendix IV (i)

SHORT FORM MCGILL PAIN QUESTIONNAIRE and PAIN DIAGRAM

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Check the column to indicate the level of your pain for each word, or leave blank if it does not apply to you. __

| | | Mild | Moderate | Severe |
|----|-------------------|-------|----------|--------|
| 1 | Throbbing | _____ | _____ | _____ |
| 2 | Shooting | _____ | _____ | _____ |
| 3 | Stabbing | _____ | _____ | _____ |
| 4 | Sharp | _____ | _____ | _____ |
| 5 | Cramping | _____ | _____ | _____ |
| 6 | Gnawing | _____ | _____ | _____ |
| 7 | Hot-burning | _____ | _____ | _____ |
| 8 | Aching | _____ | _____ | _____ |
| 9 | Heavy | _____ | _____ | _____ |
| 10 | Tender | _____ | _____ | _____ |
| 11 | Splitting | _____ | _____ | _____ |
| 12 | Tiring-Exhausting | _____ | _____ | _____ |
| 13 | Sickening | _____ | _____ | _____ |
| 14 | Fearful | _____ | _____ | _____ |
| 15 | Cruel-Punishing | _____ | _____ | _____ |



Mark or comment on the above figure where you have your pain or problems.

Indicate on this line how bad your pain is—at the left end of line means no pain at all, at right end means worst pain possible.

| | | |
|---------|-------|---------------------|
| No Pain | _____ | Worst Possible Pain |
|---------|-------|---------------------|

| | | | | | |
|---|-----|---|-----|-----|-----|
| S | /33 | A | /12 | VAS | /10 |
|---|-----|---|-----|-----|-----|

PRCS

The following statements are typical attitudes and reactions to chronic pain. We would like you to indicate how much you agree with each statement using the following scale:

| | not at all 0 | slightly 1 | a little 2 | in part 3 | largely 4 | very much 5 |
|---------------------------------------|-----------------|---------------|---------------|--------------|--------------|----------------|
| 1. I can predict pain | 0 | 1 | 2 | 3 | 4 | 5 |
| 2. I cannot influence pain | 0 | 1 | 2 | 3 | 4 | 5 |
| 3. Stress increases pain | 0 | 1 | 2 | 3 | 4 | 5 |
| 4. Only medicine or a doctor can help | 0 | 1 | 2 | 3 | 4 | 5 |
| 5. I am powerless | 0 | 1 | 2 | 3 | 4 | 5 |
| 6. I can do something about pain | 0 | 1 | 2 | 3 | 4 | 5 |
| 7. Pain is a matter of fate | 0 | 1 | 2 | 3 | 4 | 5 |
| 8. I cannot do anything | 0 | 1 | 2 | 3 | 4 | 5 |
| 9. I tried, but gave up | 0 | 1 | 2 | 3 | 4 | 5 |
| 10. I try to forget pain | 0 | 1 | 2 | 3 | 4 | 5 |
| 11. I am worried about the future | 0 | 1 | 2 | 3 | 4 | 5 |
| 12. I try to distract myself | 0 | 1 | 2 | 3 | 4 | 5 |
| 13. I do not give in, I fight | 0 | 1 | 2 | 3 | 4 | 5 |
| 14. Pain is a challenge | 0 | 1 | 2 | 3 | 4 | 5 |
| 15. I have learnt to live with it | 0 | 1 | 2 | 3 | 4 | 5 |

PRSS

The following statements are typical thoughts of people in pain. We would like you to indicate how often such statements enter your mind when you experience pain using the following scoring system:

| | almost never 0 | occasionally 1 | sometimes 2 | often 3 | frequently 4 | almost always 5 |
|--------------------------------------|----------------------|-------------------|----------------|------------|-----------------|-----------------------|
| 1. I feel better when I relax | 0 | 1 | 2 | 3 | 4 | 5 |
| 2. I cannot stand pain | 0 | 1 | 2 | 3 | 4 | 5 |
| 3. I can do some things | 0 | 1 | 2 | 3 | 4 | 5 |
| 4. I cannot change my pain | 0 | 1 | 2 | 3 | 4 | 5 |
| 5. I must relax | 0 | 1 | 2 | 3 | 4 | 5 |
| 6. I can deal with it | 0 | 1 | 2 | 3 | 4 | 5 |
| 7. I need medication | 0 | 1 | 2 | 3 | 4 | 5 |
| 8. I will soon be better | 0 | 1 | 2 | 3 | 4 | 5 |
| 9. It will never stop | 0 | 1 | 2 | 3 | 4 | 5 |
| 10. I am a hopeless case | 0 | 1 | 2 | 3 | 4 | 5 |
| 11. Other things are worse than pain | 0 | 1 | 2 | 3 | 4 | 5 |
| 12. I can cope | 0 | 1 | 2 | 3 | 4 | 5 |
| 13. When will the pain be worse | 0 | 1 | 2 | 3 | 4 | 5 |
| 14. Pain gets to me | 0 | 1 | 2 | 3 | 4 | 5 |
| 15. I cannot go on | 0 | 1 | 2 | 3 | 4 | 5 |
| 16. Pain drives me crazy | 0 | 1 | 2 | 3 | 4 | 5 |
| 17. Distraction helps me | 0 | 1 | 2 | 3 | 4 | 5 |
| 18. I can help myself | 0 | 1 | 2 | 3 | 4 | 5 |

PASS

Individuals who experience pain develop different ways to respond to that pain. We would like to know what you do and what you think about when in pain. Please use the rating scale below to indicate how often you engage in each of the following thoughts or activities. Circle any number from 0 (NEVER) to 5 (ALWAYS) for each item.

| | | <u>NEVER</u> | | | | | <u>ALWAYS</u> | | | | |
|-----|--|--------------|---|---|---|---|---------------|--|--|--|--|
| | | 0 | 1 | 2 | 3 | 4 | 5 | | | | |
| 1. | I think that if my pain gets too severe, it will never decrease..... | 0 | 1 | 2 | 3 | 4 | 5 | | | | |
| 2. | When I feel pain I am afraid that something terrible will happen..... | 0 | 1 | 2 | 3 | 4 | 5 | | | | |
| 3. | I go immediately to bed when I feel severe pain | 0 | 1 | 2 | 3 | 4 | 5 | | | | |
| 4. | I begin trembling when engaged in activity that increases pain | 0 | 1 | 2 | 3 | 4 | 5 | | | | |
| 5. | I can't think straight when I am in pain | 0 | 1 | 2 | 3 | 4 | 5 | | | | |
| 6. | I will stop any activity as soon as I sense pain coming on | 0 | 1 | 2 | 3 | 4 | 5 | | | | |
| 7. | Pain seems to cause my heart to pound or race | 0 | 1 | 2 | 3 | 4 | 5 | | | | |
| 8. | As soon as pain comes on I take medication to reduce it..... | 0 | 1 | 2 | 3 | 4 | 5 | | | | |
| 9. | When I feel pain I think that I may be seriously ill..... | 0 | 1 | 2 | 3 | 4 | 5 | | | | |
| 10. | During painful episodes it is difficult for me to think of anything else besides the pain..... | 0 | 1 | 2 | 3 | 4 | 5 | | | | |
| 11. | I avoid important activities when I hurt | 0 | 1 | 2 | 3 | 4 | 5 | | | | |
| 12. | When I sense pain I feel dizzy or faint..... | 0 | 1 | 2 | 3 | 4 | 5 | | | | |
| 13. | Pain sensations are terrifying | 0 | 1 | 2 | 3 | 4 | 5 | | | | |
| 14. | When I hurt I think about the pain constantly | 0 | 1 | 2 | 3 | 4 | 5 | | | | |
| 15. | Pain makes me nauseous (feel sick) | 0 | 1 | 2 | 3 | 4 | 5 | | | | |
| 16. | When pain comes on strong I think I might become paralyzed or more disabled | 0 | 1 | 2 | 3 | 4 | 5 | | | | |
| 17. | I find it hard to concentrate when I hurt | 0 | 1 | 2 | 3 | 4 | 5 | | | | |
| 18. | I find it difficult to calm my body down after periods of pain..... | 0 | 1 | 2 | 3 | 4 | 5 | | | | |
| 19. | I worry when I am in pain | 0 | 1 | 2 | 3 | 4 | 5 | | | | |
| 20. | I try to avoid activities that cause pain..... | 0 | 1 | 2 | 3 | 4 | 5 | | | | |

Chronic Pain Imagery

Some people report having mental images and/or pictures of their pain, do you have these? (Please circle)

Yes

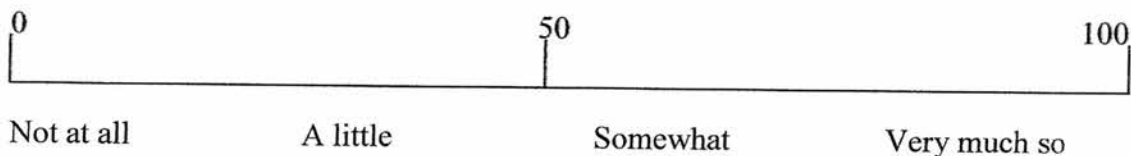
No

If so, can you please detail below, giving as much detail as you feel necessary:

How vivid are these images? (please circle)

| | |
|---|----------|
| Perfectly clear and as real as the actual experience | Rating 7 |
| Very clear and comparable in experience to the actual experience | Rating 6 |
| Moderately clear and vivid | Rating 5 |
| Not clear or vivid, but recognisable | Rating 4 |
| Vague and dim | Rating 3 |
| So vague and dim as to be hardly discernable | Rating 2 |
| No feeling present at all, you only "knowing" that you are thinking of the feeling | Rating 1 |

Do you experience physical sensations when you have this image? (please place a mark on the line where you feel is most similar to your answer)



What are the emotions that you associate with this image? (please circle)

Sad Guilty Ashamed Other

Helpless Anxious Angry

If “other” to the above question, then what emotions do you associate with your image?

When you experience the image how long does it last (on average)? (please circle)

Moments

Minutes

Hours

Longer

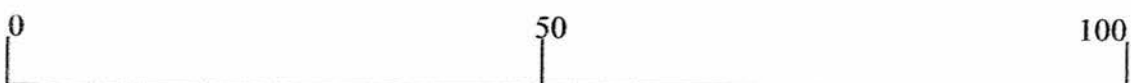
How controllable was this image? (please place a mark on the line where you feel is most similar to your answer)



Completely
controllable

Completely
uncontrollable

How distressing was this image? (please place a mark on the line where you feel is most similar to your answer)



Not at all

Moderately

Severely